Historic, archived document

Do not assume content reflects current
scientific knowledge, policies, or practices

Circular No. 638

A Compilation of the Vitamin Values of Foods in Relation to Processing and Other Variants

LELA E. BOOHER, formerly Senior Nutrition Chemist
EVA R. HARTZLER, formerly Assistant Chemist
ELIZABETH M. HEWSTON, Associate Chemist
Bureau of Home Economics

For sale by the Superintendent of Documents, Washington, D. C., Price 25 cents

UNITED STATES DEPARTMENT OF AGRICULTURE
WASHINGTON, D. C., May 1942

LIBRARY
RECEIVED
★ JUN [illegible] 1942 ★
U. S. Department of Agriculture

Circular No. 638

May 1942 • Washington, D. C.

UNITED STATES DEPARTMENT OF AGRICULTURE

A Compilation of the Vitamin Values of Foods in Relation to Processing and Other Variants

A summary of the vitamin A, thiamin, ascorbic acid, vitamin D, and riboflavin values of foods in terms of International Units or absolute weights of these vitamins, as recorded in the literature through December 1940

By Lela E. Booher[1], formerly *senior nutrition chemist;* Eva R. Hartzler[2], formerly *assistant chemist;* and Elizabeth M. Hewston, *associate chemist, Bureau of Home Economics*

CONTENTS

	Page
Introduction	1
Explanation of the table	3
Table	6
Literature Cited	229

INTRODUCTION

This circular summarizes the available data on the vitamin content of foods in relation to variety of plant or breed of animal, method of cultivation or feeding practice, place of production or source of material, method of cooking, processing, storage, variations in degree of maturity, and method of analysis, insofar as such information could be obtained from original published reports. Methods of analyses for several of the recognized vitamins have not as yet been established, although very promising methods are gradually being developed. For the present, potencies in the case of some of the vitamins cannot be expressed in terms of their absolute weights in foods nor have international standards been adopted for them. In view of these circumstances, it was decided to include in this com-

---

[1] Now director of the Institute of Nutrition, Milwaukee Children's Hospital, Milwaukee, Wis.
[2] Now with Bio-Chemical Research Laboratories, Parke, Davis and Company, Detroit, Mich.

424615—42——1

pilation only the recorded values for the vitamin A, thiamin, ascorbic acid, vitamin D, and riboflavin contents of foods.

The tabulated vitamin values include only those values that were determined in terms of absolute weights of the vitamins or directly in terms of International Units. The vitamin A values of foods are derived from vitamin A per se and from vitamin-A-active carotenoids. In this tabulation, all vitamin A values have been expressed in terms of International Units and no distinctions have been made with regard to various vitamin-A-active compounds. When vitamin A values were reported in terms of milligrams of vitamin A, the data were converted into International Units on the basis that 1 International Unit was equivalent to 0.3 microgram of vitamin A. When values for the carotene content of foods were reported, these values were converted into International Units of vitamin A value on the basis that 1 International Unit of vitamin A value was equivalent to 0.6 microgram of beta carotene or to 1.2 micrograms of alpha carotene. Analyses of thiamin recorded in terms of International Units were converted into micrograms of thiamin by multiplying the former values by 3. Values for ascorbic acid recorded in terms of International Units (1 International Unit=0.05 mg. of ascorbic acid) were recalculated in terms of milligrams by dividing the International Unit values by 20 in accordance with the generally accepted procedure. Vitamin values recorded only in graphs were not included because of the inaccuracies inherent in ascertaining the precise values.

The following list of periodicals from the date of establishment of the latest international standards for vitamins through December 1940 were reviewed for data on the vitamin content of food.

American Journal of Physiology.
American Journal of Public Health.
The Analyst.
Berichte der Deutschen Chemischen Gesellschaft.
Biochemical Journal.
Biochemische Zeitschrift.
British Medical Journal.
Cereal Chemistry.
Chemical Education.
Die Ernährung.
Experiment Station Bulletins.
Food Research.
Helvetica Chemica Acta.
Hoppe-Seyler's Zeitschrift für Physiologische Chemie.
Indian Journal of Medical Research.
Industrial and Engineering Chemistry:
  Analytical Edition.
  Industrial Edition.
Journal of Agricultural Research.
Journal of the American Chemical Society.
Journal of the American Dietetic Association.
Journal of the American Medical Association.
Journal of the Association of Official Agricultural Chemists.
Journal of Biological Chemistry.
Journal of Dairy Science.
Journal of Home Economics.
Journal of Nutrition.
Journal of Pediatrics.
Journal (Communications and Transactions) of the Society of Chemistry and Industry.
The Lancet.
Nature.
Poultry Science.
Proceedings of the American Society for Horticultural Science.
Proceedings of the Society for Experimental Biology and Medicine.
Science.
Zeitschrift für Vitaminforschung.

A few issues of these periodicals were not available to the authors because certain foreign periodicals for the year 1940 were not received. Data from a few issues of other periodicals were included as they came to the attention of one or another of the authors or as a result of search through chemical and nutrition abstracts. A few unpublished data were also included when made available to the authors through the courtesy of certain investigators or through analyses made in the nutrition laboratories of the Bureau of Home Economics. The sources of all unpublished data are given in the footnotes to the table of vitamin values.

EXPLANATION OF THE TABLE

Classification of Food Items

The first column of the table contains an alphabetized classification of the foods for which some one or more vitamin values were available. Subheadings, such as "dried" or "canned," are included under various foods, whenever there were sufficient data to warrant such a subclassification. The subclassification, various parts, refers, in most instances, to various parts of a single sample of a given food item. The authors are greatly indebted to several specialists on the staff of the Bureau of Plant Industry for certain classifications of plant foods, notably those for beans, cabbage, cereals, citrus fruits, lettuce, peppers, and tomatoes.

Description of Samples

In the second column of the table the authors have endeavored to summarize briefly the pertinent information important for identification of the samples analyzed by the investigators. This information was gathered from the original published reports.

When the variety of a fruit or vegetable was known, data on such samples preceded (in the order of listing under any given food item) the data on the less well-defined samples. The specified varieties under each classification of the food items in column 1 are recorded alphabetically. In the case of animal foods the breed of animal was given preference in the order of listing the special attributes of samples, and under each item designations of breeds were alphabetized.

Insofar as possible the source of the sample analyzed by the investigator and the general method of analysis also have been recorded under the heading "Description of Samples." In a few cases, when the source of the samples analyzed was not specifically stated in the original published reports but the compilers have been reasonably certain of the source, they have indicated this fact by enclosing in brackets the word or words referring to the source. Because of space limitations, no attempt has been made to indicate minor variations in the methods of analysis and the reader is referred to the specific literature, cited in the last column of the table, for further information on this subject.

Listings of Vitamin Values

Each of the main columns—headed Vitamin A value, Thiamin, Ascorbic acid, Vitamin D, and Riboflavin, respectively, is divided into two columns, designated as (a) and (b) preceded by the number corresponding to that of the main columns. Data in column (a) under each vitamin heading were arranged so that it would be possible by simple and rapid inspection to gain as clear an impression as possible of the variations in vitamin values of the edible portions of the classified items as listed in column 1. For example, the range of ascorbic acid values reported for apples, irrespective of variety and as purchased on the market or taken from the tree, is 0 to 23.4 milligrams per 100 grams of edible portion of apple. (See column 5a.)

Any figures printed in italics in the (a) columns under the five vitamin headings are not representative of values for food items as foods are generally produced or marketed. For the most part italicized figures represent data on underdeveloped or overdeveloped forms of plant food or on diseased samples. In scanning the data in the (a) columns with reference to some particular food item, then, the reader should exclude from his evaluation of vitamin values of foods as they are produced or marketed, all values recorded in italics. References to the corresponding description of sample will, in any given case, indicate why a figure has been italicized and therefore excluded from the category of foods as generally produced or marketed for human consumption.

From many published reports it was obvious that the food samples analyzed were not strictly fresh in the sense that they were analyzed immediately after production or harvesting, although the investigators did not mention any specific condition or time of storage. However, it was clear in the case of all data recorded in the column (a) under each vitamin heading that the investigators considered the samples as edible or marketable products, unless the description indicates otherwise.

In the case of potatoes the ascorbic acid values were, in general, observed to undergo marked changes on storage. In view of the fact that so many investigators neglected to mention whether or not storage was involved, data on both freshly harvested and stored samples of potatoes were included in column (a).

The figures in the respective (b) columns under the five vitamin headings represent values which in some manner reflect a condition not inherent in foods as they are designated in column 1. The variant in each instance is specified in the description of sample given in column 2. The values shown in these columns in boldface type represent matched sampling with those in boldface type immediately preceding in the (a) column. For example, the ascorbic acid value of fresh amaranth leaves, shown in the table in boldface type in the (a) column under the heading of ascorbic acid is 112.1 milligrams per 100 grams of fresh sample. After storage for 24 hours the ascorbic acid value of samples of the same lot of leaves was 59.9 milligrams per 100 grams of leaves. After storage for 4 days the ascorbic acid value of the leaves was further reduced to 5.5 milligrams per 100 grams of leaves.

Boldface type has also been used to denote matched samples when values are recorded consecutively in the (a) or (b) columns under one general description reported by one investigator. This situation appears for the first time in the table in connection with data recorded on the thiamin values for white wheat bread. In this case the crust, the portion directly under the crust, the center portion, and the whole slices of toasted bread represent carefully matched samples. The thiamin values of 100, 120, 120, and 110 micrograms, respectively, per 100 grams of dried product indicate both absolute and relative values for different portions of the toasted slices as compared with the toasted whole slice.

When any investigator's data have been listed to show what happens to the vitamin values of the fresh sample after some subsequent processing, such as dehydrating or canning, the data for the processed product have not been repeated under any subclassification denoting processing. For example, under the item, apple, data on Northern Spy apples grown in New York include data on the ascorbic acid value of the fresh sample as well as matched samples made into applesauce. The ascorbic acid value for applesauce made from Northern Spy apples is not repeated under the separate classification of applesauce.

In setting up the material under description of sample the authors of this bulletin have endeavored to present the work of each investigator as closely in accord as possible with the purpose and objective of the investigator. Data from the same report might deal with such diverse objectives as showing how degrees of maturity affected the vitamin value of apples and how dehydration of apples affected their vitamin value. Even though the samples used for these two studies might have been of the same variety and from the same source and analyzed by the same method, it was hardly likely that the samples could have been matched. In such cases the authors of this bulletin have endeavored to be very careful not to give the impression that the samples used in the two studies were necessarily related or matched. Appropriate spacing or repetition of the more general aspects of sample identification was frequently used to achieve this end.

Column of References

The last column (column 8) in the table carries the reference numbers to the literature citations, alphabetized by authors, corresponding to the data given in the table.

TABLE

Vitamin values per 100 grams of edible portions of foods

[The data in column (a) under each vitamin heading refer to values for foods as classified in column (1). The data in column (b) under each vitamin heading represent values that reflect an effect of some variant specified in column (2). Figures in boldface type under any one specific description of a food given in column (2) represent matched samples.]

Item	Description of sample	Vitamin A value		Thiamin (vitamin B1)		Ascorbic acid (vitamin C)		Vitamin D		Riboflavin		References
(1)	(2)	(3a)	(3b)	(4a)	(4b)	(5a)	(5b)	(6a)	(6b)	(7a)	(7b)	(8)
		I. U.	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
Abalone:												
Dried	China; dye titration					18.0						41
Alexanders:												
Various parts	[England]; thiochrome method:											
	Leaves			114								210
	Roots			63								
Alfalfa	2 determinations on same sample; Michigan; colorimetric method.	[1] **19,800** [1] **21,000**										20
	Ground, 2 determinations on same sample; U. S. A.; colorimetric method.	[1] **21,700** [1] **20,700**										20
	do	[1] **55,300** [1] **54,700**										20
	do	[1] **21,700** [1] **21,200**										20
	do	[1] **19,500** [1] **21,300**										20
	Whole green plants 6–15 inches high; U. S. A.; colorimetric method.	[1] 5,300– 15,000										7
	Grimm and Harrison varieties; Michigan; colorimetric method:											
	Plants 5 inches high	[1] 15,000										243
	Plants 8 inches high	[1] 13,500										
	Plants 11 inches high	[1] 10,300										
	Plants 13 inches high	[1] 11,200										
	Green plants, 2 samples; U. S. A.; chromatographic-spectrographic method.	[1] 12,000 [1] 17,000										187
Leaves	2 determinations on same sample; U. S. A.; colorimetric methods.	[1] **17,300** [1] **18,800**										20
	2 determinations on same sample; Michigan; colorimetric methods.	[1] **24,500** [1] **23,800**										20
Meal	Dehydrated; U. S. A.; colorimetric method	[1,2] 24,250										88
	do	[1,2] 13,050										
	do	[1,2] 10,700										
	do	[1,2] 15,000										

Almond	Unblanched, raw; Washington, D. C., market sample; rat-growth method.			246								(6)
	Unblanched; rat-growth method	0										29
Amaranth	Leaves; India; dye titration					174.9						211
	Leaves; India; dye titration:											
	Fresh					112.1						212
	After 24-hour storage at room temperature						59.9					
	After 4-day storage at room temperature						5.5					
	Leaves; Java; rat-growth method	1,580–4,800										98
	India; fluorometric method									156		195
Apple	Boskoop; Germany; dye titration:											
	Analyzed Nov. 11, 1938					5.3						144
	Stored 2 months at 0° C						5.1					
	Stored 4 months at 0° C						4.7					
	Stored 2 months at 4° C						4.5					
	Stored 4 months at 4° C						4.7					
	Stored 2 months in barn						4.1					
	Stored 4 months in barn						2.8					
	Boskoop; Germany; dye titration:											
	Pared, trees fertilized with potassium and phosphorus.					4.8						144
	Pared, trees fertilized with 90 kg. nitrogen per hectare.					3.3						
	Pared, trees fertilized with 120 kg. nitrogen per hectare.					3.1						
	Pared, trees fertilized with 180 kg. nitrogen per hectare.					3.0						
	Delicious; Washington; rat-growth method	ca 102										258
	Delicious; grown near Washington, D. C.; rat-growth method.	ca 50										29
	James Grieves; [England]; thiochrome method			24								210
	Jonathan; U. S. A.; dye titration					4.4						34
	King Pippin; dessert; [England]; thiochrome method.			45								209
	McIntosh; small; dye titration					2.0						43
	Miller Seedling; [England]; thiochrome method			57								210
	Northern Spy; New York; dye titration:											
	Unpared					11						48
	Pared						10					
	Unpared and quartered					11						
	1 hour after quartering						9					
	3 hours after quartering						7					
	Pared and quartered					10						
	1 hour after paring and quartering						8					

International Unit values were calculated from carotene analyses or included carotene analyses.

[5] Values on cooked- or processed-weight basis.

[6] Unpublished data, Bureau of Home Economics.

Vitamin values per 100 grams of edible portions of foods—Continued

Item	Description of sample	Vitamin A value		Thiamin (vitamin B_1)		Ascorbic acid (vitamin C)		Vitamin D		Riboflavin		References
(1)	(2)	(3a)	(3b)	(4a)	(4b)	(5a)	(5b)	(6a)	(6b)	(7a)	(7b)	(8)
Apple—Continued.	Northern Spy; New York; dye titration—Con.	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
	3 hours after paring and quartering						7					48
	Pared and quartered, made into unstrained sauce, sugar added, cooked 18 minutes.						6					
	Pared and quartered, made into sauce, strained						7					
	Unpared, baked in uncovered baking dish						3.2					
	Unpared, baked in covered baking dish						3.0					
	Pared, made into pie						1.3					
	Pared; Altenburg, Germany; dye titration:											
	Ontario variety					20.8						144
	Gelber Edel variety					18.9						
	Boskoop variety					4.7						
	Potts Seedling; [England]; thiochrome method			57								210
	Quarenden; [England]; thiochrome method			57								210
	Rome Beauty; average and range; Washington; dye titration:											
	Trees grown on irrigation plot receiving 30 acre-inches of water.					3.6 1.8–5.4						258
	Trees grown on irrigation plot receiving 60 acre-inches of water.					4.2 3.0–7.2						
	Stayman Winesap; U. S. A.; rat-growth method			<25								28
	Warner King; [England]; thiochrome method			57								210
	Winesap; average and range, 5 samples; Washington; dye titration:											
	Trees grown on Cashmere sandy loam soil					5.8 5.0–6.8						258
	Trees grown on Cashmere sandy loam soil; fertilized with nitrogen, phosphorus, and potassium for 3 years.					5.4 4.6–6.4						
	Winesap; average and range; Washington; dye titration:											
	Trees grown on irrigation plot receiving 30 acre-inches of water.					3.2 3.0–3.4						258
	Trees grown on irrigation plot receiving 60 acre-inches of water.					4.8 3.6–5.3						
	Winter Banana; average and range; Washington; dye titration:											
	Flesh and peel					6.6 6.1–7.1						258
	Apples from same trees harvested 2 weeks later					4.9 3.5–7.0						

	Wolfe River; freshly picked; Ohio; dye titration					9.9						34
	Worcester Pearmain; [England]; thiochrome method.			69								210
	Boston market; spectrographic method	[1] 58–147										82
	Small; China; dye titration					0						41
	Average and range; England; dye titration					12 4–17						202
	Cortex portion; average and range, 10 batches; England; dye titration.					8.3 3.9–13.9						200
	Variety unknown; [England]; thiochrome method			18								209
	France; thiochrome and lumiflavin methods, respectively.			10						5		83
	Range, 25 varieties from 23 localities; pared; Germany; dye titration.					0.3–23.4						144
	India; dye titration					0.1						1
	India; fluorometric method									30		291
	Unpared; Rumania; dye titration					7.5–12.0						204
	Rumania; dye titration					13.0–15.5						204
	U. S. A.; fluorometric method									73		126
	U. S. A.; rat-growth method									4.3		157
	Cooked or canned; average and range; England; dye titration.						[2] 2 [2] 1–4					202
	Cooked; U. S. A.; dye titration						[2] 0					68
Frozen	Boston market; spectrographic method	[1] 36										82
Juice	Commercial sample; U. S. A.; dye titration:											
	Canned in tin						[2] 0.5					199
	Canned in glass; average and range, 3 samples						[2] 0 8 [2] 0.5–1.1					
	Pasteurized commercial sample; England						[2,3] 4					39
Sauce	Commercial sample; U. S. A.; dye titration:											
	Canned in tin; average and range, 3 samples						[2] 0.8 [2] 0.3–1.2					199
	Canned in glass, 2 samples						[2] 0 [2] 2.0					
Various parts	Bramley Seedling; England; dye titration:											
	Cortex from stored sample					13.9						200
	Peel from same apple					50.0						
	Cortex from stored sample					16.7						
	Peel from same apple					83.3						
	Golden Delicious; fresh; Washington; dye titration:											
	Peel and flesh					4						257
	Flesh only					1.7						
	Rome Beauty; stored 5 months at 7.2° C.; Washington; dye titration:											
	Peel and flesh					2.7						257
	Flesh only					1.5						

[1] International Unit values were calculated from carotene analyses or included carotene analyses
[2] Values on cooked- or processed-weight basis.
[3] Values per 100 ml.

Vitamin values per 100 grams of edible portions of foods—Continued

Item	Description of sample	Vitamin A value		Thiamin (vitamin B₁)		Ascorbic acid (vitamin C)		Vitamin D		Riboflavin		References
(1)	(2)	(3a)	(3b)	(4a)	(4b)	(5a)	(5b)	(6a)	(6b)	(7a)	(7b)	(8)
Apple—Continued.												
Various parts—Con.	Schöner aus Boskoop variety; Germany; dye titration:	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
	Pared, red side of apple					7.0						144
	Pared, green side of apple					4.1						
	Winesap; stored 5 months at 7.2° C.; Washington; dye titration:											
	Peel and flesh					2.7						257
	Flesh					1.5						
	Winter Banana; Washington; dye titration:											
	Whole apple; average and range					4.9 3.5–7.0						258
	Peel on; average and range					14.8 12.2–16.8						
	Flesh only; average and range					4. 2.7–5.3						
	Flesh from center section					2.5						
	Flesh next to peel					4.3						
	Flesh from calyx end					5.4						
	Flesh from stem end					4.8						
	Yellow Newtown; stored 5 months at 7.2° C.; Washington; dye titration:											
	Peel and flesh					5						257
	Flesh only					2.8						
	England; dye titration:											
	Cortex from young growing fruit					4.9						200
	Peel from same apple					16.8						
	Ripe; India; dye titration:											
	Flesh					2.1						211
	Peel from same apple					2.6						
	India; dye titration:											
	Flesh					20.2						225
	Peel					53.3						
	Average, values for 9 varieties; unpared; Maine; dye titration:											
	From "sunny side" of apples					7.85						194
	From "shady side" of apples					4.49						
Apricot	California	4,000 or more										189
	China; dye titration					0						41
	[England]; thiochrome method			60								209
	India; fluorometric method									88		291
	Western Australia; dye titration					6						123

Dried	[England]; thiochrome method:											
	Raw			171								209
	Stewed				[2] 96							
	Sulfured; California; rat-growth method	5,800										29
	Cooked; England; dye titration						[2] 2					211
Kernels	China; dye titration					51.7						41
	Dried, sweetened; China; dye titration						[2] 3.3					41
Arrowroot	[England]; thiochrome method			Nil								209
Artichoke	Globe; [England]; thiochrome method			285								209
	Jerusalem; [England]; thiochrome method			228								210
	Variety unknown; India; dye titration					Trace						211
Various parts	Globe; France; thiochrome and lumiflavin methods, respectively:											
	Outer bracts			20						5		83
	Inner bracts			3						1–5		
Asparagus	Martha Washington; New Jersey; rat-growth method:											
	Fresh			195								72
	Blanched and frozen				[2] 153							
	Blanched, canned in No. 2 can				[2] 69							
	Liquid from above can				96							
	Martha Washington; U. S. A.; dye titration:											
	Fresh					20–30						256
	After exposure to atmosphere of carbon dioxide						9–13					
	Martha Washington; garden fresh; Ohio; dye titration.					100.7						34
	Palmetto; medium green cooked; South Carolina; rat-growth method.	[4] 960										29
	Boston market; spectrographic method	[1] 370–1,400										82
	Fresh, green, edible portion; average, 3 batches; England; dye titration.					44.3						200
	England; dye titration:											
	Fresh, entire edible portion					29.4–68.6						200
	After cooking, liquid discarded						[4] 19.5–27.0					
	3–70 days after commercial canning, liquid discarded.						[4] 14.0–17.0					
	Market sample; U. S. A.; dye titration					45						34
	Gathered May 23–June 9; U. S. A.; dye titration:											
	Freshly cut					18–44						82
	Stored 24 hours at 35°–52° F						9–32					
	Fresh, green; U. S. A.; rat-growth method			177								28
	U. S. A.; dye titration:											
	Fresh					83						34
	Cooked, liquid discarded						[2] 61					
	Cooked, liquid included						[2] 71					

---

[1] International Unit values were calculated from carotene analyses or included carotene analyses.

[2] Values on cooked- or processed-weight basis. [4] Values on raw-weight basis.

Vitamin values per 100 grams of edible portions of foods—Continued

Item (1)	Description of sample (2)	Vitamin A value (3a)	 (3b)	Thiamin (vitamin B$_1$) (4a)	 (4b)	Ascorbic acid (vitamin C) (5a)	 (5b)	Vitamin D (6a)	 (6b)	Riboflavin (7a)	 (7b)	References (8)
Asparagus—Con.												
Canned	Martha Washington; New Jersey; rat-growth method:	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
	Blanched, processed 23 minutes at 115.5° C. in No. 2 cans.			69								72
	Liquid from above can				96							
	Commercial samples; average and range, 3 samples; U. S. A.; dye titration:											
	Canned in tin					5.8 2–9						199
	Canned in glass					4.9 1.6–10						
	Cooked or canned, average and range; England; dye titration.					28 13–44						202
Frozen	Martha Washington; blanched; U. S. A.; rat-growth method.			153								72
	Boston market, commercially frozen; spectrographic method.	[1] 700										82
	Commercial sample, cut Apr. 28–May 16; U. S. A.; dye titration.					18–32						82
	Overmature, cut May 20–June 3; U. S. A.; dye titration.					9–15						82
	Commercial sample; U. S. A.; fluorometric method									129		126
Various parts	Very young; England; dye titration:											
	Tips uncolored					100						201
	White stem					0						
	Tips, short, faint purple					85						
	White stem					27						
	Young; England; dye titration:											
	Tips, deep purple, no green					111						201
	White stem					29						
	Young, shoot showing green tip; England; dye titration:											
	Tips					130						201
	Green stem					62						
	White stem					20						
	Full grown for cutting, slender shoot; England; dye titration:											
	Tips					121						201
	Green stem					73						
	White stem					17						

	Full grown for cutting, thick shoot; England; dye titration:											
	Tips					87						201
	Green stem					47						
	White stem					15						
	Fresh tips only; average, 3 batches; England; dye titration.					97.9						200
	Fresh; range, 5 samples; England; dye titration:											
	Tips					34.1–165.4						200
	Middle, green-stem portions					16.3–71.7						
	White-stem portions					8.0–25.6						
Avocado	Medium yellow; Florida; rat-growth method	128										29
	Java; rat-growth method	50–60										98
	[U. S. A.]; rat-growth method			102								28
	[U. S. A.]; dye titration					27.9						34
Bacon	Cured; composite of 4 lots; Washington, D. C., market; rat-growth method:											
	Raw, 71 percent visible fat			480								
	Fried, crisp				[4] 210							
	do				[2] 720							
	Streaked with lean; thiochrome method:											
	Raw			264								209
	Fried				[2] 360							
	Fried; bradycardia method				[2] 840–1,440							13
Bamboo	Young sprouts; Java; rat-growth method	19–25										98
Banana	Cavendish; freshly picked; western Australia; dye titration.					12						123
	Golden Gros; freshly picked; western Australia; dye titration.					2						123
	Gros Michel; normally ripened, dye titration:											
	Columbia; average and range, 35 samples					11.0 8.4–14.2						114
	Costa Rica; average and range, 58 samples					10.9 8.9–14.3						
	Ecuador; average and range, 25 samples					10.2 9.2–11.3						
	Honduras; average and range, 30 samples					10.0 9.6–10.2						

---

[1] International Unit values were calculated from carotene analyses or included carotene analyses.
[2] Values on cooked- or processed-weight basis.
[4] Values on raw-weight basis.
[6] Unpublished data, Bureau of Home Economics.

Vitamin values per 100 grams of edible portions of foods—Continued

Item (1)	Description of sample (2)	Vitamin A value		Thiamin (vitamin B_1)		Ascorbic acid (vitamin C)		Vitamin D		Riboflavin		References (8)
		(3a)	(3b)	(4a)	(4b)	(5a)	(5b)	(6a)	(6b)	(7a)	(7b)	
		I. U.	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
Banana—Con.	Gros Michel; ripe; Columbia; dye titration:											
	Sliced; average and range, 5 samples					11.6 8.4–14.2						114
	20 minutes after slicing; average, 4 samples						10.2					
	1 hour 20 minutes after slicing; average, 4 samples.						9.0					
	2 hours 40 minutes after slicing; average, 4 samples.						8.4					
	10 hours 40 minutes after slicing; average, 4 samples.						6.9					
	21 hours 20 minutes after slicing; average, 4 samples.						6.6					
	Gros Michel; Costa Rica; dye titration:											
	Peel green, pulp hard; average and range, 10 samples.					*5.3* 4.9–5.8						114
	Peel yellow and green; average and range, 15 samples.					*6.3* *3.8–11.4*						
	Peel yellow with green tip; average and range, 20 samples.					*8.8* *5.2–13.0*						
	Peel all yellow; average and range, 20 samples					9.1 5.6–13.2						
	Peel yellow, flecked with brown; average and range, 18 samples.					11.1 8.9–14.3						
	Peel black, pulp overripe; average and range, 7 samples.					*3.2* *1.0–5.4*						
	Gros Michel; peel yellow with green tip; Costa Rica; dye titration:											
	Raw					9.3						114
	Baked in skins						[2] 9.6					
	Baked without skins						[2] 4.8					
	Broiled						[2] 8.5					
	Sautéed						[2] 6.8					
	Gros Michel; peel yellow, flecked with brown, Costa Rica; dye titration:											
	Raw					10.7						114
	Baked in skins						[2] 6.6					
	Baked without skins						[2] 4.9					
	Broiled						[2] 7.3					
	Sautéed						[2] 5.5					
	Pisang radja; Java; dye titration					4.9						244
	do					8.2						244
	Pisang Mas; Java; dye titration					7.2						244
	Pisang Ambon; Java; dye titration					4.6						244

	Pisang radja sereh; Java; dye titration					4.2						244
	Pisang poelo; Java; dye titration					3.9						244
	Pisang Soekaboemi; Java; dye titration					2.3						244
	Pisang Lampoeng; Java; dye titration					1.0						244
	Sugar; freshly picked; western Australia; dye titration.					4						123
	Canton; China; dye titration					22.4						41
	Average and range, samples as delivered from refrigerator car; Honduras; dye titration:											
	Peel green; pulp hard					*6.1* *4.8–6.9*						160
	Peel yellow					6.3 4.9–8.1						
	Peel brown					7.3 5.7–9.2						
	Green; India; dye titration					*2.1*						1
	Green; India; fluorometric method									*24*		291
	Yellow; India; dye titration					<1.0						1
	Red; India; dye titration					1.4						1
	India; fluorometric method									35		291
	do									40		291
	Singapore; fluorometric method									48		291
	Average and range, 4 varieties; India; dye titration					1.98 1.0–3.2						38
	Dye titration:											
	Green					*13.5–15.5*						256
	Ripened at 19° C. to full yellow color					10.0–11.0						
	Ripened at 19° C. to browning of peel					10.0–11.0						
	Green; thiochrome method			*18*								209
	Ripe; thiochrome method			24								
	Ripe; rat-growth method									47.7		157
	Ripe; rat-growth method and dye titration, respectively.			49.8		7.0						113
	Ripe; average and range; rat-growth method	420 520–380										113
	Ripe; dye titration					19.5						68
	Ripe; average and range; dye titration					7 6–8						202
	Ripe; rat-growth method			54								28
	Ripe; dye titration					28.4						34
	Ripe; rat-growth method	ca 400										29
	Fluorometric method									84		126
Powder	Spray-dried ripe bananas; dye titration					5.1						114
	Drum-dried ripe bananas; dye titration					6.3						114
Various parts	India: dye titration:											
	Flesh					5.2						225
	Peel					6.2						
Banana passion fruit.	Western Australia; dye titration					44						123

---

[3] Values on cooked- or processed-weight basis.

Vitamin values per 100 grams of edible portions of foods—Continued

Item	Description of sample	Vitamin A value		Thiamin (vitamin B_1)		Ascorbic acid (vitamin C)		Vitamin D		Riboflavin		References
(1)	(2)	(3a)	(3b)	(4a)	(4b)	(5a)	(5b)	(6a)	(6b)	(7a)	(7b)	(8)
		I. U.	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
Barcelona nuts	Thiochrome method			114								209
Barley:												
Germ	[England]; bradycardia method			4, 200								11
Pearled	Cooked product; thiochrome method				[2] 24							209
Plant	Fresh green plants, 6–15 inches high; U. S. A.; colorimetric method.	[1] 16, 000										7
Whole grain	Fermentation method:											
	Atlas; obtained Kansas			750								235
	Atlas Vaughn; obtained Kansas			770								
	Club Mariout; obtained Kansas			630								
	"D" North Dakota; obtained Chicago			610								
	"D" South Dakota; obtained Chicago			610								
	"D" Wisconsin; obtained Chicago			560								
	Flynn; obtained Kansas			650								
	Franklin (Oderbrucker); obtained Kansas			620								
	Illinois; obtained Chicago			610								
	Improved Manchuria; obtained Minnesota			920								
	Lico; obtained Kansas			710								
	Oderbrucker; obtained Wisconsin			570								
	Wisconsin barbless (Wisconsin 38); obtained Wisconsin.			470								
	No. 1 Hanna (2-row); Oregon; obtained Chicago.			380								
	No. 2 Hanna (2-row); Oregon; obtained Chicago.			470								
	No. 2 Iowa; obtained Chicago			500								
	No. 1 Michigan; obtained Chicago			510								
	No. 2 Michigan; obtained Chicago			530								
	No. 1 Minnesota; obtained Chicago			510								
	No. 2 Minnesota; obtained Chicago			560								
	No. 1 North Dakota; obtained Chicago			470								
	No. 2 North Dakota; obtained Chicago			560								
	No. 1 South Dakota; obtained Chicago			580								
	No. 1 Wisconsin; obtained Chicago			510								
	No. 2 Wisconsin; obtained Chicago			510								
	Oderbrucker; Wisconsin; obtained Chicago			660								
	Red River Valley; Minnesota; obtained Chicago.			530								
	Spartan; obtained Michigan			570								
	Spartan; obtained Kansas			720								
	Stavropol; obtained Kansas			870								
	Trebi; obtained Kansas			820								

	Vaughn; obtained Kansas			710								235
	Velvet; obtained Minnesota			750								
	White Smyrna; obtained Kansas			710								
	Wisconsin barbless (Wisconsin No. 38); obtained Michigan.			550								
	Wisconsin barbless (Wisconsin No. 38); obtained Minnesota.			650								
	Wisconsin barbless (Wisconsin No. 38); obtained Chicago.			550								
	Soil given no manure; England; bradycardia method:											
	1935			330								159
	1936			240								
	Soil treated with 14 tons of dung per acre; England; bradycardia method:											
	1935			600								159
	1936			330								
	Soil treated with complete mineral manure; England; bradycardia method:											
	1935			390								159
	1936			240								
	Soil treated with complete mineral manure plus 412 pounds ammonium sulfate per acre; England; bradycardia method:											
	1935			330								159
	1936			240								
	Soil treated with 412 pounds ammonium sulfate per acre; England; bradycardia method:											
	1935			330								159
	1936			330								
	Holland; thiochrome method			450								288
Bean:												
Broad:												
Immature	Fresh; average, 2 batches; England; dye titration					27.7						200
	England; dye titration:											
	Fresh, raw					27.7						200
	Cooked, liquid discarded						[2] 7.8					
	Commercially canned, liquid discarded						[2]14.7–15.5					
	Liquid from cooked sample						8.9					
	Liquid from canned sample						16.6–17.6					
	India; fluorometric method									50		291
	India; dye titration					12.2						211
Gram	Green; India; fluorometric method									502		195
	Red; China; dye titration					4.56						41

---

[1] International Unit values were calculated from carotene analyses or included carotene analyses.

[2] Values on cooked- or processed-weight basis.

Vitamin values per 100 grams of edible portions of foods—Continued

Item	Description of sample	Vitamin A value		Thiamin (vitamin B₁)		Ascorbic acid (vitamin C)		Vitamin D		Riboflavin		References
(1)	(2)	(3a)	(3b)	(4a)	(4b)	(5a)	(5b)	(6a)	(6b)	(7a)	(7b)	(8)
		I. U.	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
Bean—Continued.												
Kidney:												
Green snap pods	Blue Lake; grown on Ontario clay loam; New York; dye titration.					11						170
	Bountiful; Florida; dye titration:											
	January–June					18–11						82
	November–December					10						
	Bountiful; Maryland; rat-growth method:											
	Raw			66								8
	Boiled 40 minutes				[4] 45							
	Boiled 40 minutes with soda				[4] 27							
	Bountiful; October; Maryland; dye titration					18						82
	Bountiful; July–September; Massachusetts; dye titration.					12–14						82
	Burpee Stringless; Montana; rat-growth methods and dye titration, respectively:											
	Raw	750		90		27						175
	Boiled 45 minutes		[2] 1,200		[2] 99		[2] 18					
	Home canned, stored 6 months, reheated 10 minutes.		[2] 1,000		[2] 60							
	Home canned, stored 8 months						[2] 6					
	Liquid from canned sample that had been stored 8 months.						[3] 5					
	Home canned, stored 8 months, reheated 10 minutes.						[2] 4					
	Burpee Stringless; Montana; dye titration:											
	Raw; average, 7 samples					19						175
	Boiled 45 minutes; average, 4 samples						[2] 10					
	Home canned, stored 8 months; average, 10 jars.						[2] 4					
	Home canned, stored 8 months, re-heated 10 minutes; average, 10 jars.						[2] 4					
	Liquid from canned samples; average, 10 jars						[3] 5					
	Early Bountiful; Florida; rat-growth method:											
	Raw	[5] 1,200										29
	Cooked		[4] 2,000									
	French; fresh, green; India; dye titration					2.6						1
	French; India; fluorometric method									30		291
	French; garden fresh; India; dye titration					40.9						211
	French; market sample; India; dye titration					13.8						211
	General Cornfield; grown on Ontario clay loam; New York; dye titration.					14						170

Georgian; grown on Ontario clay loam; New York; dye titration.	------	------	------	------	9	------	------	------	------	------	170
Ideal Market; grown on Ontario clay loam; New York; dye titration.	------	------	------	------	20	------	------	------	------	------	170
Ideal Market; New York; dye titration:											
Fresh	------	------	------	------	**20**	------	------	------	------	------	170
Stored 1 day at 21°–23° C	------	------	------	------	------	**14.2**	------	------	------	------	
Stored 6 days at 21°–23° C	------	------	------	------	------	**4.6**	------	------	------	------	
Stored 1 day at 1°–3° C	------	------	------	------	------	**19.6**	------	------	------	------	
Stored 6 days at 1°–3° C	------	------	------	------	------	**10.4**	------	------	------	------	
Ideal Market; New York; dye titration:											
Immature	------	------	------	------	27	------	------	------	------	------	170
Mature	------	------	------	------	*20*	------	------	------	------	------	
Overmature	------	------	------	------	*23*	------	------	------	------	------	
Kentucky Wonder; grown on Ontario clay loam; New York; dye titration.	------	------	------	------	19	------	------	------	------	------	170
Kentucky Wonder; New York; dye titration:											
Fresh	------	------	------	------	**18**	------	------	------	------	------	170
Stored 1 day at 21°–23° C	------	------	------	------	------	**10.6**	------	------	------	------	
Stored 6 days at 21°–23° C	------	------	------	------	------	**4.0**	------	------	------	------	
Stored 1 day at 1°–3° C	------	------	------	------	------	**16.7**	------	------	------	------	
Stored 6 days at 1°–3° C	------	------	------	------	------	**8.4**	------	------	------	------	
Kentucky Wonder; New York; dye titration:											
Fresh	------	------	------	------	**22**	------	------	------	------	------	170
Cooked 19 minutes	------	------	------	------	------	**14.5**	------	------	------	------	
Liquid from cooked sample	------	------	------	------	------	[3] **7.0**	------	------	------	------	
Kentucky Wonder; New York; dye titration:											
Immature	------	------	------	------	25	------	------	------	------	------	170
Mature	------	------	------	------	*18*	------	------	------	------	------	
Overmature	------	------	------	------	*22*	------	------	------	------	------	
New McCaslin; grown on Ontario clay loam; New York; dye titration.	------	------	------	------	18	------	------	------	------	------	170
New McCaslin; New York; dye titration:											
Immature	------	------	------	------	23	------	------	------	------	------	170
Mature	------	------	------	------	*19*	------	------	------	------	------	
Overmature	------	------	------	------	*18*	------	------	------	------	------	
Red Kidney; grown on Ontario clay loam; New York; dye titration.	------	------	------	------	28	------	------	------	------	------	170
Refugee; grown on Ontario clay loam; New York; dye titration:											
September harvest	------	------	------	------	18	------	------	------	------	------	170
October harvest	------	------	------	------	16	------	------	------	------	------	

[2] Values on cooked or processed weight basis.
[3] Values per 100 ml.
[4] Values on raw-weight basis.
[5] This figure may be significantly affected by method of sampling because of oxidative enzymes.

Vitamin values per 100 grams of edible portions of foods—Continued

Item	Description of sample	Vitamin A value		Thiamin (vitamin B_1)		Ascorbic acid (vitamin C)		Vitamin D		Riboflavin		References
(1)	(2)	(3a)	(3b)	(4a)	(4b)	(5a)	(5b)	(6a)	(6b)	(7a)	(7b)	(8)
Bean—Continued. Kidney—Con. Green snap pods—Continued.	Refugee; New York; dye titration:	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
	Fresh					17						170
	Stored 1 day at 21°-23° C						9.2					
	Stored 6 days at 21°-23° C						7.1					
	Stored 1 day at 1°-3° C						16.5					
	Stored 6 days at 1°-3° C						9.8					
	Refugee; New York; dye titration:											
	Fresh					17						170
	Cooked 17 minutes (done)						10.5					
	Liquid from cooked sample						[3] 4.4					
	Refugee; New York; dye titration:											
	Immature					22						170
	Mature					*19*						
	Overmature					*23*						
	Tendergreen; grown on Ontario clay loam; New York; dye titration.					24						170
	Tendergreen; New York; dye titration:											
	Immature					24						170
	Mature					*24*						
	Overmature					*24*						
	Tendergreen; garden fresh; Ohio; dye titration					45.3						34
	U. S. No. 5; grown on Ontario clay loam; New York; dye titration.					19						170
	U. S. No. 5; New York; dye titration:											
	Grown on clay loam					13						170
	Grown on muck soil					19						
	White Pea; grown on Ontario clay loam; New York; dye titration.					22						170
	Yearly average; Boston wholesale market; dye titration:											
	Fresh					17.6						82
	Stored 24 hours at 21.1° C						15					
	Stored 48 hours at 21.1° C						13					
	Green; Boston market; spectrographic method	[1] 580-1,400										82
	Fresh stringless; England; dye titration:											
	Raw					9.0						200
	Cooked, liquid discarded						[2] 1.8					
	2-5 days after commercial canning, liquid discarded.						[2] 4.1					
	Liquid from cooked sample						2.5					
	Liquid from canned sample						5.5					

	Raw					**13.5**						200
	Cooked, liquid discarded						**[2] 3.4**					
	2–5 days after commercial canning, liquid discarded.						**[2] 4.2**					
	Liquid from cooked sample						**6.2**					
	Liquid from canned sample						**5.6**					
	England; bradycardia method			75–225								13
	Fresh; average, 4 batches; England; dye titration					10.7						200
	Germany; dye titration					12						69
	Maine market; dye titration					3.3						43
	New York market; fluorometric method									93		126
	New York; spectrographic method:											
	Garden fresh	**[1] 360**										297
	After frenching		**[1] 400**									
	After scalding 2 minutes at 100° C		**[1] 350**									
	Immediately before freezing		**[1] 330**									
	Average and range, 10 varieties; U. S. A.; dye titration.					18 9–24						264
	2 determinations on same sample; U. S. A.; colorimetric methods.	**[1] 830** **[1] 1,120**										20
	Market sample; U. S. A.; rat-growth method			72								28
	Market sample; U. S. A.; dye titration					19.5						34
	U. S. A.; dye titration:											
	Raw					**45.5**						34
	Cooked, liquid discarded						**[2] 33.4**					
	Cooked, liquid included						**[2] 39.8**					
	U. S. A.; dye titration					7.2						21
	do					12.0						22
	Wilted; U. S. A.; dye titration					*6.1*						21
	U. S. A.; dye titration:											
	Summer range					15.8–22						82
	Winter range					16–19.3						
	Cooked; U. S. A.; dye titration						[2] 3.4					68
	Cooked or canned; average and range; England; dye titration.						[2] 4 [2] 2–6					202
Wax	Golden wax; cooked; Maryland; U. S. A.; rat-growth method.		[4] 350									29
	Kentucky Wonder Wax; grown on Ontario clay loam; New York; dye titration.					19						170
	Kentucky Wonder Wax; New York; dye titration:											
	Immature					27						170
	Mature					*19*						
	Overmature					*27*						
	Kidney Wax; grown on Ontario clay loam; New York; dye titration.					19						170

---

[1] International Unit values were calculated from carotene analyses or included carotene analyses.

[2] Values on cooked- or processed-weight basis.

[3] Values per 100 ml.

[4] Values on raw-weight basis.

Vitamin values per 100 grams of edible portions of foods—Continued

Item	Description of sample	Vitamin A value		Thiamin (vitamin B₁)		Ascorbic acid (vitamin C)		Vitamin D		Riboflavin		References
(1)	(2)	(3a)	(3b)	(4a)	(4b)	(5a)	(5b)	(6a)	(6b)	(7a)	(7b)	(8)
Bean—Continued. Kidney—Con. Wax—Con.	Kidney Wax; New York: dye titration:	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
	Fresh					**18**						170
	Stored 1 day at 21°-23° C						**7.2**					
	Stored 6 days at 21°-23° C						**3.4**					
	Stored 1 day at 1°-3° C						**11.9**					
	Stored 6 days at 1°-3° C						**6.3**					
	Kidney Wax; New York; dye titration:											
	Immature					21						170
	Mature					*18*						
	Overmature					*26*						
	Yellow wax; New York; fluorometric method									101		126
	Yellow wax; 2 determinations on same sample; U. S. A.; colorimetric methods.	**[1] 520** **[1] 1,080**										20
	Yellow wax; U. S. A.; rat-growth method			87								28
	Yellow wax; market sample; U. S. A.; dye titration.					23.6						34
Lima: Immature	Burpee (bush); New York; dye titration:											
	⅜-¹⁵⁄₃₂ inch diameter					49						263
	¹⁵⁄₃₂-½ inch diameter					52						
	½-⅝ inch diameter					49						
	⅝-¾ inch diameter					40						
	¾-⅞ inch diameter					30						
	Over ⅞ inch diameter					25						
	Burpee (bush); ⅝-¾ inch diameter; New York; dye titration:											
	Fresh					**36**						263
	Stored 3 days at 0° C						**31**					
	Stored 11 days at 0° C						**25**					
	Stored 3 days at 22° C						**29**					
	Stored 7 days at 22° C						**16**					
	Burpee (bush); ⅝-¾ inch diameter; New York; dye titration:											
	Shelled:											
	Fresh					**40**						263
	Stored 2 days at 0° C						**32**					
	Stored 4 days at 0° C						**28**					
	Stored 11 days at 0°C						**16**					
	Unshelled:											
	Fresh					**40**						
	Stored 2 days at 0° C						**36**					
	Stored 4 days at 0° C						**32**					
	Stored 11 days at 0° C						**27**					

Burpee; New York; dye titration:											
⅜–15/32 inch diameter:											
Fresh					**49**						263
Stored 11 days at 0° C						**34**					
15/32–½ inch diameter:											
Fresh					**52**						
Stored 11 days at 0° C						**42**					
½–⅝ inch diameter:											
Fresh					**46**						
Stored 11 days at 0° C						**37**					
⅝–¾ inch diameter:											
Fresh					**36**						
Stored 11 days at 0° C						**25**					
Challenger (climbing or pole); New York; dye titration:											
⅜–15/32 inch diameter					60						263
15/32–½ inch diameter					59						
½–⅝ inch diameter					45						
⅝–¾ inch diameter					38						
¾–⅞ inch diameter					34						
Over ⅞ inch diameter					22						
Fordhook (bush); New York; dye titration:											
⅜–15/32 inch diameter					46						263
15/32–½ inch diameter					48						
½–⅝ inch diameter					43						
⅝–¾ inch diameter					35						
¾–⅞ inch diameter					28						
Over ⅞ inch diameter					23						
Fordhook; New York; dye titration:											
Less than 15/32 inch diameter:											
Fresh					**46**						263
Blanched in boiling water 30 seconds, quick-frozen and stored 4 months at −17.8° C.						**33**					
Blanched in boiling water 60 seconds, quick-frozen and stored 4 months at −17.8° C.						**28**					
Blanched in boiling water 2 minutes 30 seconds, quick-frozen and stored 4 months at −17.8° C.						**24**					
¾–⅞ inch diameter:											
Fresh					**28**						
Blanched in boiling water 45 seconds, quick-frozen and stored 4 months at −17.8° C.						**20**					
Blanched in boiling water 1 minute 15 seconds, quick-frozen and stored 4 months at −17.8° C.						**18**					
Blanched in boiling water 2 minutes 30 seconds, quick-frozen and stored 4 months at −17.8° C.						**16**					

---

[1] International Unit values were calculated from carotene analyses or included carotene analyses.

Vitamin values per 100 grams of edible portions of foods—Continued

Item (1)	Description of sample (2)	Vitamin A value (3a)	Vitamin A value (3b)	Thiamin (vitamin B$_1$) (4a)	Thiamin (vitamin B$_1$) (4b)	Ascorbic acid (vitamin C) (5a)	Ascorbic acid (vitamin C) (5b)	Vitamin D (6a)	Vitamin D (6b)	Riboflavin (7a)	Riboflavin (7b)	References (8)
Bean—Continued. Lima—Continued. Immature—Con.												
	Henderson Bush; New Jersey; rat-growth method:	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
	Fresh			**201**								72
	Blanched and frozen				[2] 93							
	Blanched and canned				[2] 36							
	Liquid from canned sample				**33**							
	Hop; garden fresh; Ohio; dye titration					29.6						34
	Jackson Wonder (bush); New York; dye titration:											
	⅜-¹⁵⁄₃₂ inch diameter					36						263
	¹⁵⁄₃₂-½ inch diameter					34						
	½-⅝ inch diameter					32						
	King of the Garden (climbing or pole); New York; dye titration:											
	⅜-¹⁵⁄₃₂ inch diameter					61						263
	¹⁵⁄₃₂-½ inch diameter					63						
	½-⅝ inch diameter					51						
	⅝-¾ inch diameter					40						
	¾-⅞ inch diameter					34						
	Over ⅞ inch diameter					31						
	King of the Garden; New York; dye titration:											
	¹⁵⁄₃₂-½ inch diameter:											
	Fresh					**65**						263
	Stored 7 days at 22° C						**34**					
	½-⅝ inch diameter:											
	Fresh					**53**						
	Stored 7 days at 22° C						**34**					
	⅝-¾ inch diameter:											
	Fresh					**41**						
	Stored 3 days at 0° C						**35**					
	Stored 11 days at 0° C						**30**					
	Stored 3 days at 22° C						**30**					
	Stored 7 days at 22° C						**28**					
	McCrae (bush); New York; dye titration:											
	⅜-¹⁵⁄₃₂ inch diameter					42						263
	¹⁵⁄₃₂-½ inch diameter					40						
	½-⅝ inch diameter					32						
	⅝-¾ inch diameter					29						
	McCrae; New York; dye titration:											
	½-⅝ inch diameter:											
	Fresh					**37**						263
	Stored 3 days at 0° C						**36**					
	Stored 11 days at 0° C						**30**					
	Stored 3 days at 22° C						**34**					
	Stored 11 days at 22° C						**18**					
	⅜-¹⁵⁄₃₂ inch diameter:											
	Fresh					**46**						
	Stored 19 days at 0° C						**13**					

	Stored 7 days at 22° C						**29**					
	5/8–3/4 inch diameter:											
	Fresh					**29**						
	Stored 19 days at 0° C						**17**					
	Stored 7 days at 22° C						**25**					
	Willow leaved (pole); New York; dye titration:											
	3/8–15/32 inch diameter					48						263
	15/32–1/2 inch diameter					41						
	1/2–5/8 inch diameter					39						
	Woods Prolific (bush); New York; dye titration:											
	3/8–15/32 inch diameter					41						263
	15/32–1/2 inch diameter					39						
	1/2–5/8 inch diameter					34						
	Green; U. S. A.; rat-growth method			342								28
	Green; Boston market; spectrographic method	[1] 2,000										82
	Market sample; U. S. A.; rat-growth method		[4] 270									29
	U. S. A.; dye titration:											
	Raw					**29.7**						34
	Cooked, liquid discarded						[2] **17.2**					
	Cooked, liquid retained						[2] **24.5**					
Runner	England; dye titration:											
	Fresh, mixed sample					22.2						200
	Large, mixed sample					22.2						
	Small, mixed sample					16.7						
	Fresh; average 1 batch; England; dye titration					19.6						200
	[England]; thiochrome method			24								209
	[England]; rat-growth method:											
	Raw	**500**										46
	Boiled		**690**									
Bean, canned:												
Broad:												
Immature	2 samples, liquid discarded; England; dye titration:											
	Immediately after commercial canning					[4] **14.0** [4] **15.2**						200
	After 35-week storage at room temperature						[4] **12.8** [4] **14.4**					
Kidney:												
Dry	"Baked beans"; [England]; thiochrome method			51								209
	Small California pea beans; "oven-baked," commercial sample; 66 percent moisture; U. S. A.; rat-growth method.			96								(6)
	"Oven-baked" beans with pork, commercial sample; 66.8 percent moisture; U. S. A.; rat-growth method.			86								29
Green snap pods	New McCaslin; overmature, commercially canned in No. 5–6 can; New York; dye titration:											
	Seeds and pods					18						170
	Pods only					*18*						
	Seeds only					*45*						

---

[1] International Unit values were calculated from carotene analyses or included carotene analyses.
[2] Values on cooked- or processed-weight basis.
[4] Values on raw-weight basis.
[6] Unpublished data, Bureau of Home Economics.

Vitamin values per 100 grams of edible portions of foods—Continued

Item	Description of sample	Vitamin A value		Thiamin (vitamin B_1)		Ascorbic acid (vitamin C)		Vitamin D		Riboflavin		References
(1)	(2)	(3a)	(3b)	(4a)	(4b)	(5a)	(5b)	(6a)	(6b)	(7a)	(7b)	(8)
Bean, canned—Con. Kidney—Con. Green snap pods—Continued.	Refugee; overmature, commercially canned in No. 6 can; New York; dye titration:	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
	Seeds and pods					26						170
	Pods only					*19*						
	Seeds only					*43*						
	Refugee; immature, commercially canned in No. 2 can; New York; dye titration:											
	Seeds and pods					22						170
	Pods only					*20*						
	Seeds only					*69*						
	Refugee; mature, commercially canned in No. 4 can; New York; dye titration:											
	Seeds and pods					19						170
	Pods only					*17*						
	Seeds only					*49*						
	Sliced, liquid discarded; England; dye titration:											
	2 days after commercial canning					[4] **4.3**						200
	Stored 17 weeks at room temperature						[4] **4.2**					
	Stored 31 weeks at room temperature						[4] **4.0**					
	Whole, liquid discarded; England; dye titration:											
	2 days after commercial canning					[4] **4.6**						200
	Stored 17 weeks at room temperature						[4] **5.5**					
	Stored 31 weeks at room temperature						[4] **4.1**					
	France; thiochrome and lumiflavin methods, respectively.			35						75		83
	Germany; dye titration					0						161
	Commercially canned, stored 8 months; Montana; dye titration:											
	Direct from can					**3**						175
	Reheated 10 minutes						**3**					
	Liquid from canned sample						[5] **3**					
	Commercially canned, stored 6 months, reheated 10 minutes; Montana; rat-growth method.		1,000		60							175
	U. S. A.; dye titration					**4**						22
	Commercial sample, strained; U. S. A.; rat-growth method:											
	Canned in 1932	690										109
	Canned in 1933	1,200										
	Canned in 1934			31.5								
	Commercial sample, strained; U. S. A.; dye titration:											

	Canned in 1933					4.5						108
	Canned in 1934					3.2						
	Canned in 1935					1.8						
	Average, 2 commercial samples; strained; U. S. A.; dye titration:											
	In tin containers					4.5						199
	In glass containers					2.4						
Wax	Commercial samples; U. S. A.; dye titration:											
	In tin containers; average and range, 5 samples					4.3 1.2–11						199
	In glass containers; average and range, 4 samples.					4 2–9						
Lima: Immature	Henderson Bush; blanched and canned; New Jersey; rat-growth method.			36								72
	Commercial samples; average and range, 4 samples; U. S. A.; dye titration:											
	In tin containers					4.8 1.2–7						199
	In glass containers					4.8 2–9						
Bean, dry: Gram	Bengal; India; fluorometric method									Trace		195
	Bengal; sprouted; India; dye titration						14.2					211
	Brown; India; fluorometric method									90		291
	Brown; India; dye titration:											
	Dry seeds					2.5						1
	Sprouted						7.8					
	White; India; dye titration:											
	Dry seeds					3.0						1
	Sprouted						7.3					
Kidney: Mature	Blue pod; Michigan; rat-growth method:											
	Grown on light-to-medium sandy loam			870								142
	Grown on heavy sandy loam			810								
	Small California pea beans; U. S. A.; rat-growth method:											
	Raw			510								(6)
	Home baked 6 hours at 300° F				[2] 120							
	do				[4] 345							
	Cranberry; Michigan; rat-growth method:											
	Grown on light-to-medium sandy loam			330								142
	Grown on heavy sandy loam			330								
	Great Northern; Michigan; rat-growth method:											
	Grown on light-to-medium sandy loam			510								142
	Grown on heavy sandy loam			480								
	Michelite; grown on light-to-medium sandy loam; rat-growth method.			600								142
	Michelite; Michigan; rat-growth method	0										29

[2] Values on cooked- or processed-weight basis.
[3] Values per 100 ml.
[4] Values on raw-weight basis.
[6] Unpublished data, Bureau of Home Economics.

Vitamin values per 100 grams of edible portions of foods—Continued

Item	Description of sample	Vitamin A value		Thiamin (vitamin B_1)		Ascorbic acid (vitamin C)		Vitamin D		Riboflavin		References
(1)	(2)	(3a)	(3b)	(4a)	(4b)	(5a)	(5b)	(6a)	(6b)	(7a)	(7b)	(8)
Bean, dry—Con. Kidney—Con. Mature—Con.	Robust; Michigan; rat-growth method:	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
	Grown on light-to-medium sandy loam			720								142
	Grown on heavy sandy loam			720								
	Yellow Eye; Michigan; rat-growth method:											
	Grown on light-to-medium sandy loam			300								142
	Grown on heavy sandy loam			330								
	1200-1; Michigan; rat-growth method:											
	Grown on light-to-medium sandy loam			600								142
	Grown on heavy sandy loam			420								
	Michigan; rat-growth method:											
	Grown on light-to-medium sandy loam			420								142
	Grown on heavy sandy loam			360								
	Haricot, cooked; [England]; bradycardia method				[2] 105–180							13
	Navy; U. S. A.; rat-growth method:											
	Raw			**750**								8
	Soaked 16 hours, boiled 85 minutes				[4] **720**							
	Soaked 16 hours, soda added, boiled 53 minutes				[4] **795**							
	Navy; U. S. A.; rat-growth method			384								28
	Pinto; cooked; New Mexico; rat-growth method										800	158
Lima: Mature	Henderson Bush; Maryland; rat-growth method	0										29
	England; thiochrome method:											
	Raw			420								209
	Boiled				[2] 183							
	[England]; bradycardia method			480								11
	U. S. A.; rat-growth method			510								28
Urd	Mung; black; India fluorometric method									67		291
	Mung; black; India; dye titration:											
	Dry seeds					**2.7**						1
	Sprouted						**10.5**					
	Mung; brown; India; dye titration:											
	Dry seeds					**2.3**						1
	Sprouted						**11.7**					
	Mung; green; India; fluorometric method									80		291
	Mung; green; India; dye titration:											
	Dry seeds					**3.0**						1
	Sprouted						**23.0**					
Bean, frozen: Kidney: Green snap pods	Bountiful; commercial sample; frozen January-April; U. S. A.; dye titration.					5–11.2						82

	Kentucky Wonder; commercial sample; frozen July–October; U. S. A.; dye titration.					5–7						82
	Refugee; commercial sample; frozen May–June; U. S. A.; dye titration.					4–7						82
	2 commercial samples; stored at 0° F.; U. S. A.; rat-growth method.	680 510										297
	2 commercial samples; stored at −40° F.; U. S. A.; rat-growth method.	610 400										297
	Boston market; commercial sample; spectrographic method.	[1] 5,400										82
	Average for commercial samples; frozen January–October; dye titration.					6.5						82
Wax	Boston market; commercial sample; spectrographic method.	[1] 1,240										82
Lima:												
Immature	Henderson Bush; blanched and frozen; New Jersey; rat-growth method.			93								72
	Commercial sample; frozen July–August; U. S. A.; dye titration:											
	Green					22–28						82
	5–15 percent of beans white					18–23						
	25 percent of beans white					14						
	Green; Boston market; commercial sample; spectrographic method.	[1] 1,800										82
Beef	Lean, raw; bradycardia method			90–150								13
	Lean, muscle; U. S. A.; rat-growth method			114								28
	Lean round; U. S. A.; rat-growth method	Nil										29
	Round; U. S. A.; rat-growth and microbiological methods, respectively:											
	Raw			[7] 290						[7] 290		182; 183
	Broiled 20 minutes				[4][7] 148							182
	Roasted 2.5 hours				[4][7] 132						[4][7] 165	182; 183
	Fried 20 minutes				[4][7] 290						[4][7] 198	182; 183
	Round; U. S. A.; microbiological method:											
	Raw									[4] 190		183
	Fried 20 minutes										[4][7] 165	
	Thiochrome method			69								209
	Dye titration					0						68
	Rumania; dye titration					1.70						204
	Steak, stewed; bradycardia method				[2] 30–60							13
Various organs (see Brains, Kidney, Liver, etc.).												
Beer	Dark variety; Germany; bioassay			[3] 9								231
	Light variety; U. S. A.; dye titration					0						255
	Kaffir beer; South Africa; dye titration					[3] ca 0.8						87
	Range, 3 samples; Japan; lumiflavin method									14.2–25.3		249

---

[1] International Unit values were calculated from carotene analyses or included carotene analyses.
[2] Values on cooked- or processed-weight basis. [3] Values per 100 ml. [4] Values on raw-weight basis. [7] Values calculated from authors' data.

Vitamin values per 100 grams of edible portions of foods—Continued

Item	Description of sample	Vitamin A value		Thiamin (vitamin B$_1$)		Ascorbic acid (vitamin C)		Vitamin D		Riboflavin		References
(1)	(2)	(3a)	(3b)	(4a)	(4b)	(5a)	(5b)	(6a)	(6b)	(7a)	(7b)	(8)
		I. U.	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
Beet	Common, Detroit dark red variety; Maryland; rat-growth method.	<100										29
	Common; [England]; thiochrome method			18								209
	Common; Germany; dye titration					17						69
	Common; U. S. A.; dye titration					6						21
	Common; U. S. A.; rat-growth method			ca 50								28
	Common; U. S. A.; fluorometric method									23		126
	Sugar beet, raw; Europe; spectrographic method	0										290
	Sugar beet, red; Rumania; dye titration					7.0–7.3						204
	Germany; dye titration:											
	Raw					**21.8**						161
	Cooked in water, liquid included						[4] **20.1**					
	Cooked in water, liquid discarded						[4] **20.1**					
	Canned						[4] **13.2**					
	Pickled						[4] **20.4**					
	Pickled, steamed						[4] **19.9**					
	Boiled; England; bradycardia method				[2] 210							11
	Cooked; Rumania; dye titration						[2] 5.75					204
Canned	Germany; dye titration					13.2						161
	Commercial sample, strained and canned; U. S. A.; rat-growth method.			10.5								109
Various parts	Common; Germany; modified dye titration:											
	Lower half					12						32
	Upper half					19						
	Leaf stalks					20						
	Leaves					33						
Beet greens	Germany; modified dye titration					33						32
	U. S. A.; fluorometric method									82		126
	Wonderful Early Spring; cooked; Maryland; rat-growth method.		[4] 16,100									29
Betel	India; dye titration					6.1						38
	Leaves; India; fluorometric method									1,260		195
	do									31		291
	Leaves; India; dye titration					4.8–5.2						211
Blackberry	[England]; thiochrome method			39								209
	[England]; bradycardia method			0–60								13
	South Carolina; rat-growth method	83										29
	U. S. A.; rat-growth method			<25								28

	U. S. A.; dye titration					7						21
Juice	Commercial sample, pasteurized; England					Trace						39
Blueberry	Cabot; cultivated; Massachusetts; rat-growth method.	100										180
	Wild; high-bush; U. S. A.; rat-growth method	100										180
	Boston market; spectrographic method	[1] 100										82
	North Carolina; dye titration					6						21
	U. S. A.; rat-growth method			45								28
Frozen	Commercial sample; Boston market; spectrographic method.	[1] 110										82
	Commercial sample, packed in New York; rat-growth method.	<50										29
Bone marrow	[England]; rat-growth method	810										46
Bonito	Back muscle of the fish; 68.7 percent moisture; Japan; lumiflavin method.									7.7		248
	Pickled back muscle; 64.5 percent moisture; Japan; lumiflavin method.									0		248
Brain	Beef; U. S. A.; rat-growth and microbiological methods, respectively.			[7] 179						250		182; 183
	Beef; U. S. A.; microbiological method									[4] [7] 243		183
	Beef; thiochrome method			30								209
	Pig; China; dye titration					24.9						41
	Pig; [England]; bradycardia method			180								11
	Sheep; thiochrome method			104								209
Brazil nuts	Thiochrome method			1,020								209
Bread:												
Rye	Made of 82 percent extraction of rye; Germany			177								2
	Made of 75 percent extraction of rye; Germany			150								2
Wheat:												
Miscellaneous	Made from whole-wheat flour from which germ was removed; England; bradycardia method.			195								111
	Made of 82 percent extraction of wheat; Germany			201								2
	Made of 75 percent extraction of wheat; Germany			72								2
	Made from white flour and bran in proportions occurring in whole-wheat flour; England; bradycardia method.			150								111
	Made with 75 percent white flour and 25 percent treated wheat germ; England; bradycardia method.			360								15
	do			495								15
	do			510								15

[1] International Unit values were calculated from carotene analyses or included carotene analyses.
[2] Values on cooked- or processed-weight basis.
[4] Values on raw-weight basis.
[7] Values calculated from authors' data.

Vitamin values per 100 grams of edible portions of foods—Continued

Item (1)	Description of sample (2)	Vitamin A value (3a)	Vitamin A value (3b)	Thiamin (vitamin B₁) (4a)	Thiamin (vitamin B₁) (4b)	Ascorbic acid (vitamin C) (5a)	Ascorbic acid (vitamin C) (5b)	Vitamin D (6a)	Vitamin D (6b)	Riboflavin (7a)	Riboflavin (7b)	References (8)
Bread—Continued. Wheat—Con. Miscellaneous—Continued.		*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
	"Germ bread," mixture of 25 parts prepared wheat germ and 75 parts white flour; England; bradycardia method.			240–270								112
	White, malt added; England; bradycardia method			81								15
	do			105								15
	Austrian bread; England; bradycardia method			150–210								13
	do			150–270								13
	White flour with 2 percent of high-vitamin-B₁ yeast; New York; fermentation method.			364								234
	do			386								234
	Made with high-vitamin-B₁ yeast; New York; fermentation method:											
	Before toasting			[8] **1,230**								128
	Lightly toasted				[8] **1,080**							
	Medium toasted				[8] **1,020**							
	Heavily toasted				[8] **970**							
	Before toasting			[8] **490**								
	Made into light toast				[8] **470**							
	Medium toasted				[8] **420**							
	Heavily toasted				[8] **370**							
	Before toasting			[8] **1,020**								
	Made into melba toast				[8] **750**							
	Made with commercially "enriched" flour, bakery sample, ½-inch end slices removed; Washington, D. C.; rat-growth method:											
	Fresh whole slices, average for 6 loaves			**240**								(6)
	Dried whole slices, average for 6 loaves, 33.6 percent moisture.				[8] **370**							
	Fresh crust, ¼-inch thick, composited from 14 loaves, 23.6 percent moisture.			**220**								
	Dried crust, ¼-inch thick, composited from 14 loaves.				[8] **290**							
	Fresh, inner portion of slices, ¼-inch crust removed, 39.4 percent moisture.			**240**								
	Dried, inner portion of slices, ¼-inch crust removed.				[8] **400**							
	Black; Rumania; dye titration					1.25						204
	White, baking-powder bread; England; rat-growth method.			0								45

	U. S. A.; dye titration					0						68
White	Commercial sponge process; England; rat-growth method.			51								45
	Short-dough process; England; rat-growth method.			75								45
	Long-dough process; England; rat-growth method			75								45
	England; thiochrome method			39								209
	Commercial samples; England; bradycardia method.			42–60								15
	Home-made; England; bradycardia method			42								15
	England; bradycardia method			36								111
	Commercial sample; England; bradycardia method.			45								112
	England; bradycardia method:											
	1935 sample			0–60								13
	1936 sample			30–60								
	1937 sample			30–90								
	"French" loaf; [England]; bradycardia method			84								15
	Germany			48								2
	New York; fermentation method			90.4								234
	do			70.8								
	do			100.5								
	New York; fermentation method:											
	Crust of toasted slice				[8] 100							128
	½ inch directly under crust of toasted slice				[8] 120							
	Center portion of toasted slice				[8] 120							
	Entire toasted slice				[8] 110							
	Before toasting			[8] 100								
	Lightly toasted				[8] 100							
	Medium toasted				[8] 100							
	Heavily toasted				[8] 100							
	Before toasting			[8] 110								
	Made into Melba toast				[8] 100							
	Made with high-vitamin-B$_1$ yeast; New York; fermentation method:											
	Crust of toasted slice				[8] 690							
	½ inch directly under crust of toasted slice				[8] 870							
	Center portion of toasted slice				[8] 1,080							
	Entire toasted slice				[8] 1,020							
	Rumania; dye titration					2.20						204
	Scotland; bradycardia method			72								15
Whole	Made with water from hard red spring wheat; Montana; rat-growth method.			300								8
	Stone-ground whole meal; England; bradycardia method.			105–180								13
	England; thiochrome method			150								209
	England; bradycardia method			270								111
	[England]; bradycardia method			150								14

---

[6] Unpublished data, Bureau of Home Economics.
[8] Values on dry-weight basis.

Vitamin values per 100 grams of edible portions of foods—Continued

Item (1)	Description of sample (2)	Vitamin A value (3a)	Vitamin A value (3b)	Thiamin (vitamin B_1) (4a)	Thiamin (vitamin B_1) (4b)	Ascorbic acid (vitamin C) (5a)	Ascorbic acid (vitamin C) (5b)	Vitamin D (6a)	Vitamin D (6b)	Riboflavin (7a)	Riboflavin (7b)	References (8)
		I. U.	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
Bread—Continued. Wheat—Con. Whole—Con.	Commercial sample; England; bradycardia method.			225								111
	England; rat-growth method			225								45
	[England]; bradycardia method			345								15
	do			360								
	Average and range; Holland; thiochrome method			170 160-180								288
	New York; fermentation method			388								234
	do			357								
	New York; fermentation method:											
	Before toasting			[8] 670								128
	Lightly toasted				[8] 670							
	Medium toasted				[8] 650							
	Heavily toasted				[8] 590							
	Crust of toasted slice				[8] 530							
	½ inch directly under crust of toasted slice				[8] 670							
	Center portion of toasted slice				[8] 750							
	Entire toasted slice				[8] 680							
	38-percent moisture content; U. S. A.; fermentation method.			101								127
	do			143								
	do			121								
	U. S. A.; dye titration					0						43
Broccoli	Emerald Isle; fresh; New York; dye titration:											
	July					115						280
	September					172						
	Emerald Isle; July; New York; dye titration:											
	Freshly harvested					114						280
	Stored 2 weeks at 1°–3° C. after harvesting						110					
	Italian Early Calabrese; New York; dye titration:											
	July					111						280
	September					141						
	Italian Early Calabrese; July; New York; dye titration:											
	Freshly harvested					127						280
	Stored 2 weeks at 1°–3° C. after harvesting						128					
	Italian Green Sprouting; fresh; New York; dye titration:											
	July					118						280
	September					184						

	Italian Green Sprouting; July; New York; dye titration:											
	Freshly harvested					116						280
	Stored 2 weeks at 1°–3° C. after harvesting						129					
	Italian Sprouting; garden fresh; Ohio; dye titration.					137.5						34
	Italian Sprouting; market sample; U. S. A.; dye titration.					80.1						34
	Propagane; fresh; New York; dye titration:											
	July					130						280
	September					159						
	Propagane; July; New York; dye titration:											
	Freshly harvested					145						280
	Stored 2 weeks at 1°–3° C. after harvesting						141					
	California; dye titration:											
	May					90						82
	November					108						
	Massachusetts; dye titration:											
	June					67						82
	October					112						
	Fresh; average, 4 varieties; New York; dye titration:											
	July					119						280
	September					164						
	Average, 4 varieties; July; New York; dye titration:											
	Freshly harvested					126						280
	Stored 2 weeks at 1°–3° C. after harvesting						127					
	Texas; dye titration:											
	January					122						82
	March					80						
	Fresh, 2 samples; U. S. A.; fluorometric method									226 210		126
	U. S. A.; rat-growth method			99								28
	Overmature; U. S. A.; fluorometric method									214		126
	U. S. A.; dye titration:											
	Raw					162.5						34
	Cooked, liquid discarded						[2] 62.2					
	Cooked, liquid retained						[2] 88.9					
Frozen	Boston market; spectrographic method	[1] 4,680										82
Various parts	Emerald Isle; fresh; July; New York; dye titration:											
	Buds					146						280
	Stems					113						
	Emerald Isle; autumn; New York; dye titration:											
	Buds, freshly harvested					185						280
	Buds, stored 2 weeks at 1°–3° C. after harvesting.						173					
	Buds, stored 4 days at room temperature after harvesting.						119					

---

[1] International Unit values were calculated from carotene analyses or included carotene analyses.

[2] Values on cooked- or processed-weight basis.

[5] Values on dry-weight basis.

Vitamin values per 100 grams of edible portions of foods—Continued

Item (1)	Description of sample (2)	Vitamin A value (3a)	Vitamin A value (3b)	Thiamin (vitamin B_1) (4a)	Thiamin (vitamin B_1) (4b)	Ascorbic acid (vitamin C) (5a)	Ascorbic acid (vitamin C) (5b)	Vitamin D (6a)	Vitamin D (6b)	Riboflavin (7a)	Riboflavin (7b)	References (8)
Broccoli—Continued.												
Various parts—Con.	Italian Early Calabrese; fresh; July; New York; dye titration:	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
	Buds					141						280
	Stems					104						
	Italian Early Calabrese; autumn; New York; dye titration:											
	Buds, freshly harvested					**171**						280
	Buds, stored 2 weeks at 1°-3° C. after harvesting.						**147**					
	Italian Green Sprouting; fresh; July; New York; dye titration:											
	Buds					160						280
	Stems					109						
	Italian Green Sprouting; autumn; New York; dye titration:											
	Buds; freshly harvested					**199**						280
	Buds; stored 2 weeks at 1°-3° C. after harvesting.						**189**					
	Buds; stored 4 days at room temperature after harvesting.						**98**					
	Propagane; fresh; July; New York; dye titration:											
	Buds					135						280
	Stems					108						
	Propagane; autumn; New York; dye titration:											
	Buds; freshly harvested					**180**						280
	Buds; stored 2 weeks at 1°-3° C. after harvesting.						**148**					
	Fresh; average, 4 varieties; July; New York; dye titration:											
	Buds					146						280
	Stems					109						
	Average, 4 varieties; autumn; New York; dye titration:											
	Buds; freshly harvested					**184**						280
	Buds; stored 2 weeks at 1°-3° C. after harvesting.						**164**					
	Market sample, cooked; U. S. A.; rat-growth method:											
	Buds		[4] 3,500									29
	Leaves		[4] 7,300									
	Commercial sample, frozen, June-November; dye titration:											

	Buds						57–124					82
	Stems						110–149					
Brussels sprouts	Range, 3 batches; England; dye titration:											
	Fresh					90–115						200
	Cooked, liquid discarded						[2] 26.5–45.5					
	6 days after commercial canning						[2] 50.0–52.6					
	Liquid from cooked samples						16.2–25.0					
	Liquid from canned samples						50.0–55.5					
	Average and range, 10 batches; fresh; England; dye titration.					126.2 90–146						200
	England; bradycardia method			180								11
	Germany; dye titration:											
	Raw					79.0						161
	Cooked in water, liquid included						[4] 77.3					
	Cooked in water, liquid discarded						[4] 43.8					
	Steamed						[4] 66.9					
	India; dye titration					71.8						211
	Market sample; U. S. A.; dye titration:											
	Autumn season					184.6						34
	Winter season					119						
	U. S. A.; rat-growth method			171								28
	Cooked; average and range; England; dye titration.						[2] 32 [2] 19–44					202
Canned	Commercially canned, liquid discarded; England; dye titration:											
	Lacquered cans:											
	6 days after canning					[4] 50.1						200
	After 17-week storage at room temperature.						[4] 41.6					
	Unlacquered cans:											
	6 days after canning					[4] 54.1						
	After 17-week storage at room temperature.						[4] 47.3					
Frozen	Commercial sample; Boston market; spectrographic method.	[1] 2,200										82
	Commercial sample, frozen, cooked; rat-growth method.		[4] 640									29
Various parts	Fresh; England; dye titration:											
	Outer leaves of sprout					139.7						200
	Inner leaves, same sprout					137.9						
	Heart of same sprout					146.0						
	Stem of same sprout					127.3						
Buckwheat:												
Flour	Washington, D. C., market; rat-growth method			740								([6])

---

[1] International unit values were calculated from carotene analyses or included carotene analyses.
[2] Values on cooked- or processed-weight basis.
[4] Values on raw-weight basis.
[6] Unpublished data, Bureau of Home Economics.

Vitamin values per 100 grams of edible portions of foods—Continued

Item (1)	Description of sample (2)	Vitamin A value (3a)	 (3b)	Thiamin (vitamin B₁) (4a)	 (4b)	Ascorbic acid (vitamin C) (5a)	 (5b)	Vitamin D (6a)	 (6b)	Riboflavin (7a)	 (7b)	References (8)
Buckwheat—Con. Whole-grain	Virginia; obtained Washington, D. C.; fermentation method:	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
	Japanese			470								235
	Rye-Buckwheat Sel 37			750								
	Rye-Buckwheat			850								
	Silverhull			420								
	Wing Emarginatum			500								
Burdock	Greens; Ohio; dye titration					69.6						35
Butter, cow's	From Ayrshire cows; farm-produced; England; rat-growth and rat-curative methods, respectively:											
	April 1933	640						34				191
	August 1933	2,140						45				
	From Ayrshire cows; farm-produced; November 1933–April 1934; England; rat-growth method.	940–1,690										
	From Holstein cows on prairie hay and grain mixture for over 2 years; Kansas; spectrophotometric method.	[1] 1,142										156
	From Holstein cows on alfalfa hay; sorgo silage and grain mixture through summer drought; Kansas; spectrophotometric method.	[1] 1,879–1,993										156
	From mixed breed of cows; pooled commercial samples; during summer drought; Kansas; spectrophotometric method.	[1] 1,898–1,972										156
	Purchased on London market; Denmark:											
	Rat-growth method:											
	August 1933	2,090										191
	December 1934	1,340										
	May 1935	1,000										
	Rat-curative method:											
	January 1932							18				
	August 1932							8.5				
	Average for Danish winter butter, from Jutland district; rat-growth method.	1,810										289
	Jutland district of Denmark; rat-growth and rat-curative methods, respectively:											
	October 1936	3,880						30				289
	November 1936–April 1937	1,080–2,200						8–30				
	May–October 1937	1,170–5,670						15–54				

England; spectrographic method:											
Cows on pasture; average, 12 samples	[1] [8] 3,400										93
Cows stall fed; average, 58 samples	[1] [8] 1,850										
2 samples, produced October 1933; England; rat-growth method.	2,070 1,880										191
London market; August 1932; England; rat-curative method.							67				191
England; rat-curative method:											
Produced June 1932							63				191
Produced July 1932							46				
Dairy; 2 samples; [England]; rat-growth method	4,500 3,360										46
Farm produced; Holland; rat-growth and rat-curative methods, respectively:											
February 1935	1,200						10				191
May 1935	3,080						31				
June 1935	3,650						49				
September 1935	3,050						56				
October 1935	3,720						24				
January 1936	2,640						6				
Holland; rat-growth and rat-curative methods, respectively:											
2 samples; May 1936	2,740 1,780						48 21				191
July 1936	3,040						>42				
August 1936	3,240						31				
Fresh; India; fluorometric method									8		195
London market; October 1932; Ireland; rat-curative method.							50				191
London market; rat-growth method:											
September 1932	2,340										191
March–May 1933	2,500– 2,540										
July–October 1933	2,100– 2,860										
December 1933	2,480										
June–October 1935	2,360– 3,210										
November 1935–May 1936	3,090– 3,860										
Average and range, 17 samples; London market; rat-curative method.							120 40–400				46
London market; January 1932; New Zealand; rat-curative method.							30				191
London market; June 1932; New Zealand; rat-growth and rat-curative methods, respectively.	2,400						57				191
London market; August 1933; New Zealand; rat-growth method.	2,340										191

---

[1] International Unit values were calculated from carotene analyses or included carotene analyses.

[8] Values on dry-weight basis.

Vitamin values per 100 grams of edible portions of foods—Continued

Item (1)	Description of sample (2)	Vitamin A value (3a)	Vitamin A value (3b)	Thiamin (vitamin B_1) (4a)	Thiamin (vitamin B_1) (4b)	Ascorbic acid (vitamin C) (5a)	Ascorbic acid (vitamin C) (5b)	Vitamin D (6a)	Vitamin D (6b)	Riboflavin (7a)	Riboflavin (7b)	References (8)
Butter, cow's—Con.	Creamery samples; Scotland; rat-growth and rat-curative methods, respectively:	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
	Cows stall-fed; February–April 1936	1,320–1,530						8–21				191
	Cows on pasture; May–September 1936	2,200–2,950						40–99				
	Creamery; average; cows on grass May through October, barn-fed November through February; Scotland; rat-growth method:											
	Summer	2,720										289
	Winter	1,380										
	Creamery; cows barn-fed November–April, on grass May–October; Scotland; rat-growth and rat-curative methods, respectively:											
	February–April 1936	1,320–1,530						8–22				289
	May–October 1936	2,200–2,990						20–99				
	November 1936–April 1937	800–2,410						8–30				
	May 1937	2,860						30				
	London market; Scotland; rat-growth and rat-curative methods, respectively:											
	April 1936	1,020						not more than 9				289
	May 1936; 2 samples	2,090 1,240						29 21				
	Creamery; Washington, D. C.; rat-growth method:											
	Summer produced	5,900										29
	Winter produced	3,650										
	Washington retail market; purchased in winter season; rat-growth method.	ca 3,000										29
	U. S. A.; dye titration					0						68
	do					0						43
	U. S. A.; rat-growth method			3								268
Butterfat, cow's	From Ayrshire cows on mixed ration; Wisconsin; spectrophotometric method:											
	1 day after parturition	[1] 27,130										238
	3 days after parturition	[1] 4,220										
	7 days after parturition	[1] 3,870										
	30 days after parturition	[1] 2,880										
	6–100 days after parturition	[1] 3,870										
	More than 100 days after parturition	[1] 2,760										

From Ayrshire cows; England; spectrographic method:											
Average value for 1 year	1 3,430	----	----	----	----	----	----	----	----	----	95
Winter samples; cows on ration of hay, kale, and food concentrates, October through March.	1 2,650	----	----	----	----	----	----	----	----	----	
Summer samples; cows on pasture April through September.	1 4,620	----	----	----	----	----	----	----	----	----	
England; spectrographic method:											
Ayrshire; 1st and 2d day after parturition	1 17,530	----	----	----	----	----	----	----	----	----	95
Ayrshire; 1 month after parturition	1 1,530	----	----	----	----	----	----	----	----	----	
Ayrshire; 1st and 2d day after parturition	1 17,450	----	----	----	----	----	----	----	----	----	
Ayrshire; 1 month after parturition	1 2,050	----	----	----	----	----	----	----	----	----	
Friesian; 1st and 2d day after parturition	1 9,800	----	----	----	----	----	----	----	----	----	
Friesian; 1 month after parturition	1 2,370	----	----	----	----	----	----	----	----	----	
Guernsey; 1st and 2d day after parturition	1 9,780	----	----	----	----	----	----	----	----	----	
Guernsey; 1 month after parturition	1 3,750	----	----	----	----	----	----	----	----	----	
Shorthorn; 1st and 2d day after parturition	1 16,530	----	----	----	----	----	----	----	----	----	
Shorthorn; 1 month after parturition	1 2,070	----	----	----	----	----	----	----	----	----	
Shorthorn; 1st and 2d day after parturition	1 10,900	----	----	----	----	----	----	----	----	----	
Shorthorn; 1 month after parturition	1 2,850	----	----	----	----	----	----	----	----	----	
From Brown Swiss cows; on mixed ration; Wisconsin; spectrophotometric methods:											
1 day after parturition	1 21,800	----	----	----	----	----	----	----	----	----	238
2 days after parturition	1 11,500	----	----	----	----	----	----	----	----	----	
7 days after parturition	1 2,900	----	----	----	----	----	----	----	----	----	
30 days after parturition	1 6,650	----	----	----	----	----	----	----	----	----	
6–100 days after parturition	1 3,830	----	----	----	----	----	----	----	----	----	
More than 100 days after parturition	1 2,860	----	----	----	----	----	----	----	----	----	
From Friesian cows; England; spectrographic method:											
Average value for 1 year	1 3,670	----	----	----	----	----	----	----	----	----	95
Winter samples; cows on ration of hay, kale, and food concentrate; October through March.	1 2,620	----	----	----	----	----	----	----	----	----	
Summer samples; cows on pasture; April through October.	1 4,820	----	----	----	----	----	----	----	----	----	
From Guernsey cows; on mixed ration; Wisconsin; spectrophotometric method:											
1 day after parturition	1 42,740	----	----	----	----	----	----	----	----	----	238
2 days after parturition	1 20,540	----	----	----	----	----	----	----	----	----	
3 days after parturition	1 10,670	----	----	----	----	----	----	----	----	----	
7 days after parturition	1 3,620	----	----	----	----	----	----	----	----	----	
30 days after parturition	1 2,700	----	----	----	----	----	----	----	----	----	
6–100 days after parturition	1 5,120	----	----	----	----	----	----	----	----	----	
More than 100 days after parturition	1 5,210	----	----	----	----	----	----	----	----	----	

---

[1] International Unit values were calculated from carotene analyses or included carotene analyses.

Vitamin values per 100 grams of edible portions of foods—Continued

Item	Description of sample	Vitamin A value		Thiamin (vitamin B$_1$)		Ascorbic acid (vitamin C)		Vitamin D		Riboflavin		References
(1)	(2)	(3a)	(3b)	(4a)	(4b)	(5a)	(5b)	(6a)	(6b)	(7a)	(7b)	(8)
Butterfat, cow's—Continued.	From Guernsey cows; England; spectrographic method:	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
	Average value for 1 year	[1] 4,030										95
	Winter samples; cows on ration of hay, kale, and food concentrate; October through March.	[1] 3,020										
	Summer samples; cows on pasture; April through October.	[1] 5,070										
	From Guernsey cows; England; rat-curative method:											
	Cows on pasture							41				121
	0 and 1st day after parturition							122				
	2d, 3d, and half of 4th day after parturition							56				
	Half of 4th and half of 5th day after parturition							36				
	Average value, samples from 5 cows on pasture, April–June; sample collected in June; England; rat-curative method:											
	Guernsey cows							35				150
	Shorthorn cows							28				
	From Holstein cows; South Dakota; bioassay:											
	Cows fed beet pulp and grain mixture for 2 months.							19				276
	Cows fed above ration plus 10,000 units vitamin D daily for:											
	1 month							21				
	2 months							32				
	3 months							46				
	Cows fed grain ration plus 5,000 units vitamin D daily for:											
	1 month							15				
	2 months							16				
	3 months							22				
	Cows fed grain ration with beet pulp for 3–6 months.							Nil				
	From Holstein cows on mixed ration; Wisconsin; spectrophotometric method:											
	1 day after parturition	[1] 10,380										238
	2 days after parturition	[1] 10,820										
	3 days after parturition	[1] 8,510										
	7 days after parturition	[1] 4,470										
	30 days after parturition	[1] 4,270										
	6–100 days after parturition	[1] 4,480										
	More than 100 days after parturition	[1] 2,810										

1 day after parturition	[1] 19,120	--------	--------	--------	--------	--------	--------	--------	--------	--------	
2 days after parturition	[1] 11,890	--------	--------	--------	--------	--------	--------	--------	--------	--------	
3 days after parturition	[1] 6,950	--------	--------	--------	--------	--------	--------	--------	--------	--------	
7 days after parturition	[1] 2,270	--------	--------	--------	--------	--------	--------	--------	--------	--------	
30 days after parturition	[1] 2,780	--------	--------	--------	--------	--------	--------	--------	--------	--------	
Average and range, 22 Holstein cows on alfalfa hay, dry cornstalks, corn and cob meal, soybean hay and pea-vine silage; Wisconsin; spectrophotometric method.	[1] 4,247 [1] 3,470–5,070	--------	--------	--------	--------	--------	--------	--------	--------	--------	140
Average, 3 Holstein cows; Wisconsin; spectrophotometric method:											
Cows on alfalfa hay, dry cornstalks, corn and cob meal, and soybean hay and pea-vine silage.	[1] 4,317	--------	--------	--------	--------	--------	--------	--------	--------	--------	140
Average and range with pea-vine silage replaced by alfalfa hay.	[1] 3,590 [1] 3,300–4,100	--------	--------	--------	--------	--------	--------	--------	--------	--------	
Average with pea-vine silage restored to ration	[1] 4,030	--------	--------	--------	--------	--------	--------	--------	--------	--------	
From Holstein-Friesian cows; Washington; rat-growth method:											
From 10 cows on winter ration of hay	[1] 5,600	--------	--------	--------	--------	--------	--------	--------	--------	--------	124
From 10 cows on winter ration of silage	[1] 11,800	--------	--------	--------	--------	--------	--------	--------	--------	--------	
From 10 cows on winter ration of hay and silage.	[1] 9,700	--------	--------	--------	--------	--------	--------	--------	--------	--------	
From 30 cows on pasture	[1] 10,500	--------	--------	--------	--------	--------	--------	--------	--------	--------	
From Jersey cows on mixed ration; Wisconsin; spectrophotometric method:											
1 day after parturition	[1] 15,230	--------	--------	--------	--------	--------	--------	--------	--------	--------	238
2 days after parturition	[1] 10,770	--------	--------	--------	--------	--------	--------	--------	--------	--------	
3 days after parturition	[1] 5,070	--------	--------	--------	--------	--------	--------	--------	--------	--------	
7 days after parturition	[1] 2,140	--------	--------	--------	--------	--------	--------	--------	--------	--------	
30 days after parturition	[1] 2,090	--------	--------	--------	--------	--------	--------	--------	--------	--------	
6–100 days after parturition	[1] 3,820	--------	--------	--------	--------	--------	--------	--------	--------	--------	
More than 100 days after parturition	[1] 2,850	--------	--------	--------	--------	--------	--------	--------	--------	--------	
From Shorthorn cows; England; spectrographic method:											
Average value for 1 year	[1] 2,720	--------	--------	--------	--------	--------	--------	--------	--------	--------	95
Winter samples; cows on ration of hay, kale, and food concentrates; October through March.	[1] 2,350	--------	--------	--------	--------	--------	--------	--------	--------	--------	
Summer samples; cows on pasture; April through September.	[1] 3,280	--------	--------	--------	--------	--------	--------	--------	--------	--------	
From Shorthorn cows; each sample from 2 cows; England; rat-curative method:											
Cows on winter ration, kept indoors	--------	--------	--------	--------	--------	--------	27	--------	--------	--------	37
Cows on winter ration, kept out of doors	--------	--------	--------	--------	--------	--------	88	--------	--------	--------	
Cows given fresh grass, kept indoors	--------	--------	--------	--------	--------	--------	15	--------	--------	--------	
Cows on pasture	--------	--------	--------	--------	--------	--------	46	--------	--------	--------	

---

[1] International unit values were calculated from carotene analyses or included carotene analyses.

Vitamin values per 100 grams of edible portions of foods—Continued

Item (1)	Description of sample (2)	Vitamin A value (3a)	Vitamin A value (3b)	Thiamin (vitamin B₁) (4a)	Thiamin (vitamin B₁) (4b)	Ascorbic acid (vitamin C) (5a)	Ascorbic acid (vitamin C) (5b)	Vitamin D (6a)	Vitamin D (6b)	Riboflavin (7a)	Riboflavin (7b)	References (8)
		I. U.	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
Butterfat, cow's—Continued.	From Shorthorn cows; 2 cows on winter ration England; bioassays:											
	Feb. 5–8							17				149
	Mar. 10–13, after cows had received 2 pounds cacao shells for 4 weeks.							*51*				
	From Shorthorn cows; 2 cows on winter ration; England; bioassay:											
	Feb. 5–8							20				149
	Mar. 10–13							21				
	From Shorthorn cows; from a single herd on winter ration, samples all collected at same season; average values for 6 cows; England; spectrographic method:											
	10 weeks after parturition	[1] 4,430										95
	15 weeks after parturition	[1] 3,920										
	19–23 weeks after parturition	[1] 4,500										
	29 weeks after parturition	[1] 4,000										
	30 weeks after parturition	[1] 4,200										
	Average from mixed herd of cows; Wisconsin; spectroscopic method:											
	Cows on alfalfa hay, corn silage, and grain mixture.	[1] 3,715										119
	Cows on alfalfa hay, A. I. V. silage, and grain mixture.	[1] 4,530										
	Cows on alfalfa hay, molasses, alfalfa silage, and grain mixture.	[1] 4,390										
Buttermilk	India; fluorometric method									[3] 155		195
Cabbage	Allhead; grown on silty clay loam fertilized with N:K:P=21:50:20; Ohio; dye titration.					56.3						33
	Allhead Select; grown on silty clay loam fertilized with N:K:P=21:50:20; Ohio; dye titration.					48.0						33
	All Seasons; grown on silty clay loam; Ohio; dye titration:											
	Soil unfertilized					72.6						33
	Soil treated with different proportions of nitrogen, potash, and phosphate fertilizer.					70.1–89.4						
	Babyhead Special; grown on silty clay loam fertilized with N:K:P=21:50:20; Ohio; dye titration.					148						33
	Charleston; grown on silty clay loam fertilized with N:K:P=21:50:20; Ohio; dye titration.					107.5						33

Copenhagen Market; grown on silty clay loam fertilized with N:K:P=20:50:21; Ohio; dye titration.					71.9						33
Danish Ballhead; Montana; rat-growth method:											
Raw			84								177
Coarsely cut and boiled 10 minutes				[2] 63							
Danish Ballhead; Montana; dye titration:											
Raw; average, 15 samples					63						177
Coarsely cut, boiled 10 minutes; average, 15 samples.						[2] 35					
Shredded, raw					64						
Made into slaw						54					
Made into slaw, held 1 hour						54					
Boiled, dressed with hot vinegar and butter						[2] 29					
Stored 6 months; average, 7 samples						47					
Stored; coarsely cut and boiled 10 minutes						[2] 27					
Stored; shredded, raw						48					
Stored; made into slaw						40					
Stored; made into slaw and held 1 hour						40					
Stored; cooked in milk						[2] 19					
Stored; prepared au gratin						[2] 14					
Danish Ballhead; autumn; grown on clay loam; New York; dye titration.					30						99
Danish Ballhead; grown on silty clay loam, fertilized with N:K:P=20:50:21; Ohio; dye titration.					127.0						33
Detroit Resistant; grown on silty clay loam; fertilized with N:K:P=21:50:20; Ohio; dye titration.					60.7						33
Early Copenhagen; summer; grown on clay loam; New York; dye titration.					55						99
Early Dwarf Drumhead; grown on silty clay loam; fertilized with N:K:P=21:50:20; Ohio; dye titration.					116.2						33
Early Select No. 99; grown on silty clay loam; fertilized with N:K:P=21:50:20; Ohio; dye titration.					165.1						33
Early Wonder; grown on silty clay loam; fertilized with N:K:P=21:50:20; Ohio; dye titration.					70.3						33
Glory; autumn; grown on clay loam; New York; dye titration.					30						99
Glory; autumn; grown on clay loam; New York; dye titration:											
Fresh					32						99
Stored 19 days at 1°–3° C						31					
Stored 56 days at 1°–3° C						24					
Stored 84 days at 1°–3° C						21					
Stored 19 days at 8°–9° C						26					
Stored 84 days at 8°–9° C						20					
Stored 19 days at room temperature						25					
Stored 31 days at room temperature						21					
Stored 42 days at room temperature						21					

---

[1] International Unit values were calculated from carotene analyses or included carotene analyses.

[2] Values on cooked- or processed-weight basis.

[3] Values per 100 ml.

Vitamin values per 100 grams of edible portions of foods—Continued

Item	Description of sample	Vitamin A value		Thiamin (vitamin B_1)		Ascorbic acid (vitamin C)		Vitamin D		Riboflavin		References
(1)	(2)	(3a)	(3b)	(4a)	(4b)	(5a)	(5b)	(6a)	(6b)	(7a)	(7b)	(8)
Cabbage—Con.	Glory; autumn; grown on clay loam; New York; dye titration.	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
	Fresh					24						99
	Boiled 6 minutes, done						[2] 10					
	Boiled 12 minutes, overdone						[2] 8					
	Cooking liquid from 6-minute cabbage						[3] 2.1					
	Cooking liquid from 12-minute cabbage						[3] 3.0					
	Glory of Enkhuizen; 1936 crop; New York; dye titration:											
	Finely shredded					**36**						278
	Boiled 8 minutes						**[2] 9**					
	Cooking liquid from above sample						**[3] 5**					
	Finely shredded					**27**						
	Panned 20 minutes						**[2] 20**					
	Finely shredded					**33**						
	Steamed 14 minutes						**[2] 23**					
	Cooking liquid from above sample						**[3] 22**					
	Quartered					**37**						
	Boiled 8 minutes						**[2] 13**					
	Cooking liquid from above sample						**[3] 4.5**					
	Quartered					**35**						
	Steamed 25 minutes						**[2] 26**					
	Cooking liquid from above sample						**[3] 18.5**					
	Strips					**34**						
	Boiled 8 minutes						**[2] 13**					
	Cooking liquid from above sample						**[3] 3.6**					
	Golden Acre; summer; grown on clay loam; New York; dye titration.					55						99
	Golden Acre; grown on silty clay loam; fertilized with N:K:P=21:50:20; Ohio; dye titration.					82.5						33
	Golden Acre Special; grown on silty clay loam; fertilized with N:K:P=21:50:20; Ohio; dye titration.					171.0						33
	Golden Acre Y. R.; grown on silty clay loam; fertilized with N:K:P=21:50:20; Ohio; dye titration.					102.5						33
	Golden Acre (unnamed strains from Ohio station); grown on silty clay loam; fertilized with N:K:P=21:50:20; Ohio; dye titration:											

No. 2					71.1						33
No. 5					54.6						
No. 7					60.5						
No. 8					169.9						
No. 10					67.7						
No. 11					69.2						
No. 12					62.8						
Green Acre; grown on silty clay loam; fertilized with N:K:P=21:50:20; Ohio; dye titration.					137						33
Hollander; grown on silty clay loam; fertilized with N:K:P=21:50:20; Ohio; dye titration.					108.5						33
Late Copenhagen Market; autumn; grown on clay loam; New York; dye titration.					26						99
Marion Market; grown on silty clay loam; fertilized with N:K:P=21:50:20; Ohio; dye titration.					141.6						33
Marion Market Resistant; grown on silty clay loam; fertilized with N:K:P=21:50:20; Ohio; dye titration.					81.3						33
Midseason Market; grown on silty clay loam; fertilized with N:K:P=21:50:20; Ohio, dye titration.					180.9						33
Peerless; summer, grown on clay loam; New York; dye titration.					56						99
Penn State Ballhead; grown on silty clay loam; fertilized with N:K:P=21:50:20; Ohio; dye titration.					106.7						33
Wisconsin All Seasons Y. R.; grown on silty clay loam; fertilized with N:K:P=21:50:20; Ohio; dye titration.					172.8						33
Wisconsin Hollander; grown on silty clay loam; fertilized with N:K:P=21:50:20; Ohio; dye titration.					62.2						33
Wisconsin, Y. R. No.8; grown on silty clay loam; fertilized with N:K:P=21:50:20; Ohio; dye titration.					49.9						33
Average and range; Argentina; dye titration:											
Common					88 65–125						216
Red					160						
White					44 23–65						
[England]; July 1934; rat-growth method:											
Fresh	880										46
Boiled		**960**									
[England]; thiochrome method			69								209
Medium green; market sample; Florida; rat-growth method:											
Raw	[5] < 100										29
Cooked		[4] 170									

[2] Values on cooked- or processed-weight basis.

[3] Values per 100 ml.

[4] Values on rawweightbasis.

[5] This figure may be significantly affected by method of sampling because of oxidative enzymes.

Vitamin values per 100 grams of edible portions of foods—Continued

Item	Description of sample	Vitamin A value		Thiamin (vitamin B_1)		Ascorbic acid (vitamin C)		Vitamin D		Riboflavin		References
(1)	(2)	(3a)	(3b)	(4a)	(4b)	(5a)	(5b)	(6a)	(6b)	(7a)	(7b)	(8)
		I. U.	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
Cabbage—Con.	White; Germany; dye titration:											
	Raw					18.0						161
	Cooked in water, liquid included						[4] **15.5**					
	Cooked in water, liquid discarded						[4] **10.3**					
	Steamed						[4] **12.6**					
	Cooked in water 1-2 hours, liquid included						[4] **14.9**					
	Cooked in water 1-2 hours, liquid discarded						[4] **0**					
	White; Germany; dye titration:											
	Fresh					**40.3**						59
	Dried						[4] **11.4**					
	do						[2] **85.5**					
	White; Germany; dye titration					24.5						279
	do					24.2						229
	Green; Germany; dye titration					42.7						279
	Green and fresh; India; fluorometric method									215		195
	Market sample; India; dye titration					51.2						211
	India; fluorometric method									32		291
	Leaves; India; dye titration					40.5						1
	Grown on silty clay loam; fertilized with N:K:F=21:50:20; Ohio; dye titration:											
	Average and range, 30 varieties and strains					100.2 48-180.9						33
	Range, 7 strains; July					54.6-169.9						
	Range, 7 strains; November					50.2-100.4						
	Range, 3 varieties; 1938					60.7-180.9						
	Range, 3 varieties; 1939					69.5-102.1						
	Shredded; Ohio, dye titration:											
	Raw					**111.6**						34
	Cooked, liquid discarded						[2] **33.5**					
	Cooked, liquid retained						[2] **49.7**					
	Green; Rumania; dye titration:											
	Raw					**32-33.5**						204
	Cooked						[2] **7.0-19.7**					
	White; Sweden; fluorometric method									50		67
	Small-headed; average and range, 5 samples; Texas; dye titration.					130 130-158						85
	Raw, samples of freshly cut cabbage from various kraut factories; 1935; U. S. A.; dye titration.					31-44						205
	2 samples; U. S. A.; fluorometric method									66 44		121
	U. S. A.; rat-growth method			81								28

	Average and range, 4 varieties; U. S. A.; dye titration.					31 22–38						264
	New; U. S. A.; dye titration					40						22
	Dye titration					51						169
	Cooked; average and range; England; dye titration						[2] 21 [2] 11–33					202
	Bleached; U. S. A.; rat-growth method			66								(6)
Chinese	Fiji; dye titration					4.1						26
	Market sample; [U. S. A.]; dye titration					26.9						34
	U. S. A.; fluorometric method									38		126
Red	Berlin; Germany; modified dye titration:											
	Inner leaves					36						32
	Outer leaves					67						
	Red Dutch; market sample; California; rat-growth method.	ca 40										29
	Germany; dye titration:											
	Raw					57.3						161
	Cooked in water, liquid included						[4] 58.4					
	Cooked in water, liquid discarded						[4] 32.7					
	Steamed						[4] 40.9					
	Fermented						[4] 17.6					
	Fermented, steamed						[4] 10.6					
	Germany; dye titration:											
	Fresh					36.4						59
	Dried						[4] 28.6					
	do						[2] 136.8					
Savoy	Green; England; bradycardia method			240								11
	Etiolated; England; bradycardia method			180								11
	Germany; dye titration:											
	Fresh					14.3						59
	Dried						[4] 12.2					
	do						[2] 75.2					
	Germany; dye titration:											
	Raw					56.7						161
	Cooked in water, liquid included						[4] 35.5					
	Cooked in water, liquid discarded						[4] 12.9					
	Steamed						[4] 22.3					
	Fermented						2.3					
	Fermented, steamed						2.2					
Dried	Green; Germany; dye titration					84.6						59
	do					13.3						
	Savoy; Germany; dye titration					75.2						
	do					70.5						
	do					13.8						
	White, Germany; dye titration					85.5						59
	do					42.6						59
Fermented (see Sauerkraut).												

---

[2] Values on cooked- or processed-weight basis.
[4] Values on raw-weight basis.
[6] Unpublished data, Bureau of Home Economics.

Vitamin values per 100 grams of edible portions of foods—Continued

Item	Description of sample	Vitamin A value		Thiamin (vitamin B₁)		Ascorbic acid (vitamin C)		Vitamin D		Riboflavin		References
(1)	(2)	(3a)	(3b)	(4a)	(4b)	(5a)	(5b)	(6a)	(6b)	(7a)	(7b)	(8)
		I. U.	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
Cabbage—Con.												
Frozen	Commercial sample; Boston market; spectrographic method.	[1] 300										82
Juice	Fresh; U. S. A.; dye titration					[3] 42.7						102
Various parts	France; thiochrome and lumiflavin methods, respectively:											
	Inner leaves			30–50						40–50		83
	Outer leaves			10–20						40–50		
	White; Germany; modified dye titration:											
	Inner leaves					76						32
	Outer leaves					90						
	Germany; dye titration:											
	Inner leaves					55						279
	Green outer leaves					82.5						
	Garden fresh; India; dye titration:											
	Inner leaves					132.6						211
	Outer leaves					125.8						
Cacao shell	By-product of chocolate manufacture; rat-curative method.							3,500				149
Cacao shell fat	Rat-curative method							30,700				149
Carp	Fresh; Germany; chromatographic and colorimetric method.									35.2–37.5		233
Carrot	Chantenay; grown on Arlsport fine sandy loam; New York; dye titration:											
	Fresh					5.5						79
	Steamed 20 minutes						[4] 3.8					
	do						[2] 5.0					
	Fresh					6.9						
	Cooked 15 minutes						[2] 4.0					
	Cooking liquid from above sample						[3] 2.1					
	Fresh					6.4						
	Cooked 15 minutes						[4] 3.8					
	do						[2] 3.6					
	Cooking liquid from above sample						[3] 1.7					
	Tendersweet; garden fresh; Ohio; dye titration					11.1						34
	Average and range; Argentina; dye titration					5 3–7						216
	Boston market; spectrographic method	[1] 1,700–8,400										82

[England]; thiochrome method:											
Raw			45								209
Cooked				[2] 18							
Range, 3 batches; England; dye titration:											
Fresh					4.8-8.0						200
After cooking, liquid discarded						[2] 4.3-9.5					
4-5 days after commercial canning, liquid discarded.						[2] 3.1-4.1					
Liquid from cooked samples						1.4-5.6					
Liquid from canned samples						3.9-4.7					
Fresh; average and range, 10 batches; England; dye titration.					<4.0 <1.0-8.0						200
[England]; bradycardia method			180								11
[England]; thiochrome method			45								210
[England]; rat-growth method:											
Fresh	1,770										46
Boiled		1,910									
Fresh	1,980										
Boiled		1,880									
Entire roots; Europe; spectrographic method	[1] 18,900										290
Germany; dye titration:											
Fresh					3.8						59
Dried						[4] 1.9					
Dried						[2] 10.8					
Fresh					0.8						
Canned						[4] 0.8					
Germany; dye titration					1.6						69
do					3.6						279
India; modified thiochrome method			40								193
India; dye titration					2.5						211
do					6.6						1
India; fluorometric method									Trace		195
Maine market sample; dye titration					6.7						43
Rumania; dye titration					3.5						204
Texas; dye titration					8.4						85
U. S. A.; rat-growth method			72								28
U. S. A.; rat-growth method:											
Fresh			57								8
Cooked in pressure cooker				[4] 54							
Fresh			66								
Boiled 23 minutes				[4] 72							
U. S. A.; fluorometric method									67		126
U. S. A.; rat-growth method:											
Raw	ca10,000										29
Cooked		[4]ca10,000									
Cooked; average and range; England; dye titration.						[2] 6 [2] 1-15					202
Cooked; U. S. A.; dye titration						[2] 3.2					68

---

[1] International Unit values were calculated from carotene analyses or included carotene analyses.
[2] Values on cooked- or processed-weight basis.
[3] Values per 100 ml.
[4] Values on raw-weight basis.

Vitamin values per 100 grams of edible portions of foods—Continued

Item	Description of sample	Vitamin A value		Thiamin (vitamin B_1)		Ascorbic acid (vitamin C)		Vitamin D		Riboflavin		References
(1)	(2)	(3a)	(3b)	(4a)	(4b)	(5a)	(5b)	(6a)	(6b)	(7a)	(7b)	(8)
		I. U.	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
Carrot—Continued.												
Canned	Europe; spectrographic method	[1] 36,310										290
	do	[1] 13,790										290
	Commercial samples; U. S. A.; dye titration:											
	Canned in tin; average and range, 6 samples					2 0.8–4						199
	Canned in glass; average and range, 5 samples					1.6 0.9–4.5						
	Strained, canned in tin					4.2						
	Strained, canned in glass					3.4						
	Commercial sample; U. S. A.; rat-growth method:											
	Strained and canned in 1932	6,270										109
	Strained and canned in 1933	6,600										
	Strained and canned in 1934			31.5								
Dried	Germany; dye titration					10.8						59
	do					9.4						59
	do					7.6						59
Frozen	Commercial sample; Boston market; spectrographic method.	[1] 3,500										82
Juice	Fresh; U. S. A.; dye titration					[3] 4.0						102
Various parts	Europe; spectrographic method:											
	Entire roots	[1] 18,900										290
	Outer orange part of root	[1] 30,200										
	Inner yellow part of root	[1] 6,160										
	India; dye titration:											
	Flesh					31						225
	Skin					75						
Cashew nut	India; fluorometric method									190		195
Cauliflower	Danamerica; New York; dye titration:											
	July					95						280
	September					87						
	Freshly harvested					**93**						
	Held 2 weeks at 1°–3° C. after harvesting						**98**					
	Early Snowball; New York; dye titration:											
	July					89						280
	September					101						
	Freshly harvested					**103**						
	Held 2 weeks at 1°–3° C. after harvesting						**106**					
	Forbes; New York; dye titration:											
	July					97						280
	September					95						
	Freshly harvested					**96**						
	Held 2 weeks at 1°–3° C. after harvesting						**100**					

Primosnow; garden fresh; Ohio; dye titration					96.0						34
White Mountain; New York; dye titration:											
July					94						280
September					88						
Freshly harvested					94						
Held 2 weeks at 1°-3° C. after harvesting						95					
Held 4 days after harvesting at room temperature.						54					
Average, 4 varieties; New York; dye titration:											
July					93						280
September					91						
Freshly harvested					96						
Held 2 weeks after harvesting at 1°-3° C						99					
Market sample; California; rat-growth method	ca 70										29
[England]; thiochrome method			147								209
Average and range, 6 samples; [England]; thiochrome method.			146 102-171								210
[England]; bradycardia method			330								11
do			120-150								13
Germany; thiochrome method:											
Raw			90								164
Cooked, solids only				45							
Cooking water				5.0							
Steamed				60							
Liquid from steamed product				2.4							
Raw			90								
Canned, solids only				48							
Canning liquid				26							
Germany; dye titration:											
Raw					23.8						161
Cooked in water, liquid included						[4] 26.6					
Cooked in water, liquid discarded						[4] 6.5					
Steamed						[4] 18.9					
Pickled						8.1					
Pickled, steamed						0					
Germany; dye titration					50.8						69
do					33.3						229
Average and range, 3 samples; Germany; dye titration.					56.3 39-67						279
India; dye titration:											
Fresh					101.0						226
Stored 15 days in bottle at 5° C						100.5					
India; dye titration					65.8						211
do					5.9						1
India; fluorometric method									800		291
Flowers; Japan; dye colorimetric					86						90

---

[1] International Unit values were calculated from carotene analyses or included carotene analyses.

[3] Values per 100 ml.

[4] Values on raw-weight basis.

Vitamin values per 100 grams of edible portions of foods—Continued

Item (1)	Description of sample (2)	Vitamin A value (3a)	 (3b)	Thiamin (vitamin B₁) (4a)	 (4b)	Ascorbic acid (vitamin C) (5a)	 (5b)	Vitamin D (6a)	 (6b)	Riboflavin (7a)	 (7b)	References (8)
		I. U.	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
Cauliflower—Con.	Rumania; dye titration:											
	Raw					**41.0**						204
	Cooked						[2] **9.5**					
	U. S. A.; dye titration:											
	Fresh					**40**						21
	Stored for 10 days at room temperature						**33.7**					
	U. S. A.; rat-growth method			168								28
	Cooked or canned; average and range; England; dye titration.						[2] 25 [2] 16–42					202
Frozen	Commercial sample; Boston market; spectrographic method.	[1] 260										82
Various parts	Flowers; July; New York; dye titration:											
	Danamerica					100						280
	Early Snowball					103						
	Forbes					106						
	White Mountain					104						
	Stems; July; New York; dye titration:											
	Danamerica					90						280
	Early Snowball					86						
	Forbes					95						
	White Mountain					82						
	Average, 4 varieties; July; dye titration:											
	Flowers					103						280
	Stems					90						
	Argentina; dye titration:											
	Flowers; average and range					85 72–94						216
	Leaves; average and range					245 233–260						
Caviar	Thiochrome method			Nil								209
Celery	Green Utah; range for stalks; market sample; New York; dye titration:											
	Fresh					5.87–7.88						203
	Cooked						[2] **2.70–4.73**					
	Cooking liquid from above sample						**1.74–3.99**					
	Salt Lake variety; garden fresh; blanched; Ohio; dye titration.					10.4						34
	Average and range; Argentina; dye titration					10 7–14						216
	[England]; thiochrome method			45								209
	[England]; bradycardia method			Trace								11

	Washington, D. C., market sample; bleached; Florida; rat-growth method.	Nil										29
	Germany; dye titration:											
	Fresh					**17.6**						59
	Dried						[4] **5.6**					
	do						[2] **42.3**					
	India; dye titration					2.9						1
	Maine market sample; dye titration					1.3						43
	U. S. A; fluorometric method									35		126
	U. S. A.; rat-growth method			36								28
Juice	Fresh; U. S. A.; dye titration					[3] 0.9						102
Various parts	Green; Utah; market sample; dye titration:											
	Inner stalks					7.27–8.58						203
	Outer stalks					4.26–7.66						
	Leaves					22.16–31.25						
	Juice from stalks					1.05–1.26						
	White; California; market sample; dye titration:											
	Inner stalks					6.49–9.35						
	Outer stalks					4.57–4.98						
	Leaves					14.55–29.52						
	Juice from stalks					0.72–0.78						
	Leaves; India; dye titration					62.4						211
	Stalks; India; dye titration					5.7						211
	2 determinations on same sample; Michigan; colorimetric methods:											
	Leaves	[1] 13,800 [1] 14,700										20
	Stalks	[1] 580 [1] 670										
Chard	Fordhook; New York; dye titration:											
	Fresh					**36**						78
	Cooked 4 minutes, underdone						[4] **24**					
	Cooked 10 minutes, done						[4] **14**					
	Cooked 14 minutes, overdone						[4] **10**					
	Cooking liquid from chard cooked 10 minutes						[3] **6**					
	Cooking liquid from chard cooked 14 minutes						[3] **8**					
	Fresh					**37**						
	Boiled						[2] **15**					
	Cooking liquid from boiled sample						[3] **6**					
	Large Ribbed White; cooked; Maryland; Washington, D. C., market sample; rat-growth method.		[4] 14,500									29
	Lucullus; New York; dye titration:											
	Fresh					**43**						78
	Cooked 4 minutes, underdone						[4] **24**					
	Cooked 10 minutes, done						[4] **17**					
	Cooked 14 minutes, overdone						[4] **11**					
	Cooking liquid from chard cooked 10 minutes						[3] **9**					
	Cooking liquid from chard cooked 14 minutes						[3] **10**					

---

[1] International Unit values were calculated from carotene analyses or included carotene analyses.

[2] Values on cooked- or processed-weight basis.

[3] Value per 100 ml.

[4] Values on raw-weight basis.

Vitamin values per 100 grams of edible portions of foods—Continued

Item (1)	Description of sample (2)	Vitamin A value (3a)	Vitamin A value (3b)	Thiamin (vitamin B_1) (4a)	Thiamin (vitamin B_1) (4b)	Ascorbic acid (vitamin C) (5a)	Ascorbic acid (vitamin C) (5b)	Vitamin D (6a)	Vitamin D (6b)	Riboflavin (7a)	Riboflavin (7b)	References (8)
		I. U.	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
Chard—Con.	Market sample; U. S. A.; fluorometric method									138		126
Various parts	Fordhook; leaves, garden fresh; Ohio; dye titration					32.1						34
	Fordhook; stems, garden fresh; Ohio; dye titration:											
	Raw					**7.5**						34
	Cooked, liquid discarded						[2] **3.1**					
	Cooked, liquid retained						[2] **4.1**					
	Leaves; New York; dye titration					38						78
	Stem; dye titration					8						78
	Leaves; Swiss Chard; U. S. A.; dye titration:											
	Raw					**35.5**						34
	Cooked, liquid discarded						[2] **11.4**					
	Cooked, liquid retained						[2] **18.7**					
	Stems; market sample; U. S. A.; fluorometric method.									21		126
Cheese	Brick; U. S. A.; rat-growth method	1,400										116
	Camembert; rat-growth method	3,610										116
	Camembert; thiochrome method			Nil								209
	Chantelle; rat-growth method	1,910										116
	Cheddar, American; Maine market sample; dye titration.					Nil						43
	Cheddar, American; sample from Bureau of Dairy Industry; rat-growth method.	1,200										29
	Cheddar, American; New York type; U. S. A.; rat-growth method.	2,180										116
	Cheddar, American; from raw milk produced in March; Pennsylvania; rat-growth method:											
	Before ripening	ca **1,000**										100
	During ripening and storage	ca **1,000**										
	Cheddar, American; U. S. A.; rat-growth method			42								28
	do	2,160										116
	Cheddar, American; Wisconsin-type; U. S. A.; rat-growth method.	1,810										116
	do	2,400										116
	Cheddar, Old English; creamed; rat-growth method.	3,070										116
	Cheddar, English; England; rat-growth method	5,500										46
	do	750										53
	Cheddar, English; England; thiochrome method			12								209
	Cheshire; thiochrome method			33								209
	Cottage; U. S. A.; rat-growth method	190–730										116
	Cream; rat-growth method	2,110										116

	do	2,320										116
	Curd cheese; Rumania; dye titration					1.26						204
	Danish blue; rat-growth method	3,500										116
	Danish brick; rat-growth method	2,400										116
	Dutch; thiochrome method			18								209
	Edam; Nebraska; rat-growth method	1,100										116
	Edam; commercial sample; rat-growth method	2,470										116
	Gorgonzola; thiochrome method			12								209
	Gruyere; thiochrome method			6								209
	Liederkranz; rat-growth method	3,440										116
	Limburger; rat-growth method	1,280										116
	Limburger; U. S. A.; rat-growth method	1,460										116
	Neufchatel; rat-growth method	1,130– 2,190										116
	Parmesan; thiochrome method			Nil								209
	Pimento; U. S. A.; rat-growth method	2,360										116
	Pimento cream; rat-growth method	1,630– 4,250										116
	Roquefort; rat-growth method	4,010										116
	Roquefort, thiochrome method			30								209
	Sheep milk; Rumania; dye titration					1.70						204
	Stilton; thiochrome method			24								209
	Swiss; Washington, D. C., market sample; rat-growth method.	2,680										29
	Swiss; U. S. A.; rat-growth method	1,970										116
Canned	Cheddar; rat-growth method	1,550										116
Cherry	Bing; U. S. A.; rat-growth method			51								28
	Early Richmond; freshly picked; Ohio; dye titration.					138.6						34
	Sour; range, 3 varieties; Germany; dye titration					2.8–4.8						229
	Sweet; range, 4 varieties; Germany; dye titration					2.6–7.0						229
	Sweet; Germany; dye titration:											
	Fresh					2.9						59
	Canned						[4] 2.7					
	Average and range; Argentina; dye titration					25 15–38						216
	Germany; dye titration:											
	Fresh					3.7						59
	Canned						[4] 3.7					
Juice	Commercial sample; England; pasteurized					Trace						39
Chestnut	[England]; bradycardia method			270								11
Chicken	Breast from Single Comb White Leghorn; average and range; New York; fluorometric method:											
	Diet contained 1 mcg. riboflavin per gm									40 40–50		125
	Diet contained 6.9 mcg. riboflavin per gm									80 70–90		

---

[2] Values on cooked- or processed-weight basis.
Values on raw-weight basis.

Vitamin values per 100 grams of edible portions of foods—Continued

Item	Description of sample	Vitamin A value		Thiamin (vitamin B$_1$)		Ascorbic acid (vitamin C)		Vitamin D		Riboflavin		References
(1)	(2)	(3a)	(3b)	(4a)	(4b)	(5a)	(5b)	(6a)	(6b)	(7a)	(7b)	(8)
		I. U.	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
Chicken—Con.	Leg from Single Comb White Leghorn; average and range; New York; fluorometric method:											
	Diet contained 1 mcg. riboflavin per gm. ration.									100 70–110		125
	Diet contained 6.9 mcg. riboflavin per gm. ration.									420 240–740		125
	Hen, edible portion; Germany; chromatographic and colorimetric method.									52.4		233
	Dark meat; [U. S. A.]; rat-growth method			111								28
	Light meat; [U. S. A.]; rat-growth method			78								28
	Half light, half dark meat; Washington, D. C., market; rat-growth method.	Nil										29
	Muscle, chicks raised to 3 months on ascorbic acid deficient ration; dye titration.					0						133
	Muscle; U. S. A.; dye titration					4						22
	Leg, roasted:											
	Thiochrome method				[2] 51							209
	Bradycardia method				[2] 120							209
Various organs (see Heart, Liver, etc.).												
Chickweed	Ohio; dye titration					37.7						35
Chico	India; dye titration					2.5						1
Chicory	Roots; England; thiochrome method			75								210
	France; thiochrome and lumiflavin methods, respectively.			20–30						20–30		83
Chili	Patnai variety; ripe; India; dye titration:											
	Raw					171.7						25
	Cooked						[2] 218.0					25
	Patnai variety; unripe; India; dye titration:											
	Raw						80.5					25
	Cooked						[2] 152.8					25
	"Capsicum"; average and range; Argentina; dye titration:											
	Green					265 178–365						216
	Red					336 308–365						216

	Large variety; ripe; India; dye titration:											
	Raw					174.9						25
	Cooked						[2] 224.0					
	Large variety; unripe; India; dye titration:											
	Raw						19.4					25
	Cooked						[2] 150.2					
	Long variety; green; India; dye titration					78.9						211
	Round and short; green; India; dye titration					143.0						211
	Small variety; ripe; India; dye titration:											
	Raw					138.9						25
	Cooked						158.1					
	Small variety; unripe; India; dye titration:											
	Raw						9.9					25
	Cooked						[2] 105.3					
	Unripe; India; dye titration:											
	Fresh						57.4					212
	After 25 hours at room temperature						35.5					
	Green and fresh; India; fluorometric method									180		195
	Ripe; India; fluorometric method									Nil		195
	Green; India; dye titration:											
	Flesh					330						225
	Skin					390						
Chives	Garden fresh; Ohio; dye titration					54.3						34
	Germany; dye titration					41						279
Chocolate	Milk chocolate; thiochrome method			30								209
	"Plain" chocolate; thiochrome method			30								209
	Unsweetened commercial sample; rat-growth method.	ca 60										29
Citrus fruit:												
Calamondin orange	Rough-lemon rootstock; Florida; dye titration					[3] 33–35						17
	Average and range, 3 samples; Texas; dye titration					35.1 31.5–37.8						85
Grapefruit:												
Seedless	Marsh; range, 6 locations; Texas; dye titration					[3] 32.1–43.8						181
	Marsh; Texas; dye titration:											
	April					[3] 27.9						181
	November					[3] 39.2						
	Marsh; average regardless of location or season; Texas; dye titration.					[3] 36.4						181
	Marsh Pink; range, 4 locations; Texas; dye titration.					[3] 32.6–37.8						181
	Marsh Pink; Texas; dye titration:											
	April					[3] 28.5						181
	November					[3] 35.5						
	Marsh Pink; Texas; average regardless of location or season; dye titration.					[3] 32.4						181

---

[2] Values on cooked- or processed-weight basis.
[3] Values per 100 ml.

Vitamin values per 100 grams of edible portions of foods—Continued

Item	Description of sample	Vitamin A value		Thiamin (vitamin B₁)		Ascorbic acid (vitamin C)		Vitamin D		Riboflavin		References
(1)	(2)	(3a)	(3b)	(4a)	(4b)	(5a)	(5b)	(6a)	(6b)	(7a)	(7b)	(8)
Citrus fruit—Con. Grapefruit—Con. Seedless—Con.		*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
	Marsh Seedless; sour orange rootstock, Florida; dye titration.					[3] 31–46						17
	Marsh Seedless; average and range, 4 samples; Texas; dye titration.					31.3 23.6–41.7						85
	Marsh Seedless; Texas; dye titration:											
	April					[3] 30						181
	February					[3] 34						
	Marsh Seedless; dye titration:											
	Florida					[3] 38						181
	Texas					[3] 32						
	Marsh Seedless; average regardless of location or season; Texas; dye titration.					[3] 32.0						181
	Red Blush; range, 4 locations; Texas; dye titration					33.0–40.7						181
	Red Blush; Texas; dye titration:											
	April					[3] 24.9						181
	November					36.6						
	Red Blush; average regardless of location and season; Texas; dye titration.					[3] 32.7						181
	Thompson or Pink Marsh; average and range, 4 samples; Texas; dye titration.					34.7 30.4–37.4						85
Seedy	Bowen; average and range, 6 samples; Florida; dye titration.					[3] 35 [3] 33–38						52
	Common Grapefruit; rough-lemon rootstock; Florida; dye titration.					[3] 33–40						17
	Common Grapefruit; sour orange rootstock; Florida; dye titration.					[3] 39						17
	Common Grapefruit; Florida; dye titration					[3] 35–42						17
	Conner's Prolific; Texas; dye titration					36.8 34.6–38.9						85
	Davis; average and range, 6; Florida; dye titration					[3] 34 [3] 33–34						52
	Davis; average, 3 fruits; Florida; dye titration					[3] 38						52
	Duncan; Texas; dye titration					37.0 36.6–37.4						85
	Duncan; average regardless of location or season; Texas; dye titration.					[3] 37.7						181
	Duncan; Texas; range, 5 locations; dye titration					[3] 36.4–48.7						181
	Duncan; Texas; dye titration:											
	April					[3] 33.0						181
	November					[3] 41.3						

	Florida Seedling; central Florida; dye titration:											
	Fresh					[3]38–56						89
	After storage for 1 month at 42° F						[3]54					
	Florida Seedling; East Coast; dye titration:											
	Fresh					[3]38–44						89
	After storage for 1 month at 42° F						[3]41–48					
	Foster Pink; average and range, 6 samples; Florida; dye titration.					[3]33 [3]31–35						52
	Foster Pink; Florida; dye titration					[3]37						17
	Foster Pink; average and range, 3 samples; Texas; dye titration.					44.1 41.5–49.1						85
	Foster Pink; range, 5 locations; Texas; dye titration.					[3]34.8–46.9						181
	Foster Pink; Texas; dye titration:											
	April					[3]29.5						181
	November					[3]44.9						
	Foster Pink; dye titration:											
	Florida					[3]37						181
	Texas					[3]34						
	Foster Pink; average regardless of location or season; Texas; dye titration.					[3]34.3						181
	McCarty; Texas; dye titration					31.3						85
	Silver Chester; sweet orange rootstock; Florida; dye titration.					[3]50						17
	Tresca; average, 2 fruits; Florida; dye titration					[3]64						52
Unclassified	Sunshine (hybrid, grapefruit × tangerine); Florida; dye titration.					[3]29						52
	Average and range; Argentina; dye titration					58 42–75						216
	Fiji; dye titration					36.3						26
	Strained juice; Florida; rat-growth method	0										29
	From very ripe and old fruit; India; dye titration					*2.1*						211
	India; dye titration					31.2						1
	U. S. A.; dye titration					53						22
	do					[3]26.6						102
	Freshly picked; western Australia; dye titration					33						123
	Average and range; dye titration					40 28–64						202
	Rat-growth method									20.0		157
	Juice; U. S. A.; dye titration:											
	Stored 5 hours at 6° C						[3]46					254
	Stored 5 hours at 38° C						[3]44					
	Dye titration					36.4						34
	do					62						255
	Pulp; rat-growth method			72								28
	Pulp; bradycardia method			120								11
Kumquat	Oblong variety; Florida; dye titration					[3]13						17
	Oblong variety; rough-lemon rootstock; Florida; dye titration.					[3]24						17
	Freshly picked; western Australia; dye titration					30						123
	Dye titration					54.9						34

[3] Values per 100 ml.

Vitamin values per 100 grams of edible portions of foods—Continued

Item (1)	Description of sample (2)	Vitamin A value (3a)	Vitamin A value (3b)	Thiamin (vitamin B₁) (4a)	Thiamin (vitamin B₁) (4b)	Ascorbic acid (vitamin C) (5a)	Ascorbic acid (vitamin C) (5b)	Vitamin D (6a)	Vitamin D (6b)	Riboflavin (7a)	Riboflavin (7b)	References (8)
Citrus fruit—Con.												
Lemon:												
		I. U.	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
Sour varieties	Eureka; Texas; dye titration					44.6						85
	Everbearing; rough-lemon rootstock; Florida; dye titration.					[3]42						17
	Meyer Seedless; average and range, 4 samples; Texas; dye titration.					14.5 9.9–18.7						85
	Perrine; rough-lemon rootstock; Florida; dye titration:											
	Green					[3]35						17
	Ripe					[3]22						
	Green					[3]38						
	Ripe					[3]30						
	Perrine; ripe; Florida; dye titration:											
	Fresh; average, 6 lemons					[3]40						52
	Held 2 months in cold storage; average, 10 lemons.						[3]24					
	Perrine; picked in light green stage and held 2 months in cold storage; average, 8 lemons; Florida; dye titration.						[3]26					52
Unclassified	Green rind; average and range, 4 samples; Texas; dye titration.					30.1 24.0–42.2						85
	Green rind; large; average and range, 3 samples; Texas; dye titration.					15.9 13–18.2						85
	Yellow; large; average and range, 3 samples; Texas; dye titration.					11.4 9.9–14.2						85
	Yellow, round; thin rind; average and range, 3 samples; Texas; dye titration.					21.5 14.8–27.6						85
	Yellow; medium size; average and range, 3 samples; Texas; dye titration.					26.2 27.4–30.7						85
	Size 300; dye titration					49.0						217
	Average and range; Argentina; dye titration					[3]51 [3]49–57						216
	California; rat-growth method	Nil										29
	Cape Colony; dye titration:											
	Average and range, 4 samples					[3]54 [3]47–62						9
	After 1 month at room temperature; average, 2 samples.						[3]57					9
	Fiji; dye titration					24.5						26
	India; fluorometric method									5		291

	India; dye titration					38.5						1
	Italy; dye titration:											
	Average and range, 4 samples					[3] 66 [3] 54–78						9
	After 1 month at room temperature; average, 2 samples.						[3] 54					
	Average and range, 4 samples; Sicily; dye titration					[3] 68 [3] 62–77						9
	Spain; dye titration:											
	Average and range, 3 samples					[3] 68 [3] 62–73						9
	After 1 month at room temperature; 1 sample						[3] 67					
	U. S. A.; dye titration					57						22
	Freshly picked; western Australia; dye titration					33						123
	do					43						123
	Market sample; western Australia; dye titration					42						123
	Average and range; dye titration					46 29–60						202
	Dye titration					61						255
	do					35.2						146
	do					[3] 45.5						102
	Thiochrome method			18								209
	Fluorometric method									3		67
	Dye titration					64.0						34
	Juice; stored 5 hours; dye titration:											
	Stored at 6° C						[3] 56					254
	Stored at 38° C						[3] 53					
Sweet	Average, 7 lemons; Florida; dye titration					[3] 33						52
	Rough-lemon rootstock; Florida; dye titration					[3] 38						17
	do					[3] 45						17
Lime	Key (Mexican); dye titration:											
	First of August					16						85
	Middle of October; average and range, 5 samples.					21.5 17.5–26.9						
	New Caledonian variety; freshly picked; western Australia; dye titration.					26						123
	Tahiti (Persian Bearss); rough-lemon rootstock; Florida; dye titration.					[3] 32						17
	Tahiti (Persian Bearss); rough-lemon rootstock; Florida; dye titration:											
	Green					[3] 33						17
	Ripe					[3] 29						
	Rangpur; Florida; dye titration					[3] 8						17
	Rangpur; average and range, 4 samples; [Texas]; dye titration.					9.5 7.4–12.9						85
	West Indian or Key variety; average, 14 limes; Florida; dye titration.					[3] 22						52
	Fiji; dye titration					48.9						26
	Bombay variety; India; dye titration					58.8						1

[3] Values per 100 ml.

Vitamin values per 100 grams of edible portions of foods—Continued

Item	Description of sample	Vitamin A value		Thiamin (vitamin B₁)		Ascorbic acid (vitamin C)		Vitamin D		Riboflavin		References
(1)	(2)	(3a)	(3b)	(4a)	(4b)	(5a)	(5b)	(6a)	(6b)	(7a)	(7b)	(8)
Citrus fruit—Con. Lime—Con.		*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
	India; dye titration					16.8						1
	Dye titration					39.8						34
	do					[3]45.9						102
Limequat	Lakeland; average, 12 fruits; Florida; dye titration					[3]17						52
	Eustis; Cleopatra rootstock; Florida; dye titration					18						17
	Eustis; rough-lemon rootstock; Florida; dye titration.					24						17
Orangequat	Nippon; average, 8 fruits; Florida; dye titration					[3]23						52
Pummelo	Pumelo Cross; tangelo; Texas; dye titration					32.9 30.3–35.5						85
Satsuma and King Orange.	Satsuma; rough-lemon rootstock; Florida; dye titration.					[3]22–36						17
	King Orange; tangelo; rough-lemon rootstock; Florida; dye titration.					[3]16–22						17
	King Orange; tangelo; sour orange rootstock; Florida; dye titration.					[3]14–26						17
Sour orange	Bitter sweet orange; seedling; rootstock; Florida; dye titration.					[3]64–77						17
	Bitter orange; Spain; dye titration:											
	Average and range, 6 samples					[3]43 [3]35–56						9
	After 1 month at room temperature; average, 3 samples.						[3]37					
	Average and range, 8 samples					[3]33 [3]22–46						
	After 1 month at room temperature; average, 2 samples.						[3]19					
	Drake; sour orange rootstock; Florida; dye titration.					[3]50–61						17
	Seville variety; range, 24 samples; Spain; dye titration.					[3]18.9–45.5						200
	Seedling; Florida; dye titration					[3]30–48						17
Sweet orange	Blood; sweet orange rootstock; Florida; dye titration.					[3]48–51						17
	Boone's Early; rough-lemon rootstock; Florida; dye titration.					[3]52–55						17

Boone's Early; rough-lemon rootstock; Florida; dye titration:											
Picked in August; acid and immature					[3] *50*						110
Picked in December, 1 week before commercial picking; tart and watery.					[3] *46*						
Conner's Seedless; rough-lemon rootstock; Florida; dye titration.					[3] 48–52						17
Conner's Seedless; sour orange rootstock; Florida; dye titration.					[3] 50–61						17
Conner's Seedless; sour orange rootstock; Florida; dye titration:											
Picked in August, acid and immature					[3] *48*						110
Picked in October, commercial picking; slightly acid, immature.					[3] 46						
Picked in January, tart					[3] 52						
Enterprise Seedless; sour orange rootstock; Florida; dye titration.					[3] 65						17
Hamlin; rough-lemon rootstock; Florida; dye titration:											
Picked in August, acid and immature					[3] *48*						110
Picked in November, commercial picking; tart and watery.					[3] 47						
Picked in January, slightly sweet and watery					[3] 46						
Hamlin; average, 3 oranges; Florida; dye titration					[3] 48						52
Hamlin; dye titration:											
Florida					[3] 46						181
Texas					[3] 50						
Hamlin; average and range, 4 samples; Texas; dye titration.					43.4 36.8–46.7						85
Hamlin; range, 4 locations; Texas; dye titration					[3] 43.1–47.9						181
Hamlin; Texas; dye titration:											
February					[3] 46.0						181
November					[3] 51.6						
Hamlin; average for all determinations regardless of location or season; dye titration.					[3] 50.0						181
Hamlin; rough-lemon rootstock; Florida; dye titration.					[3] 40–59						17
Homosassa; rough-lemon rootstock; Florida; dye titration:											
Picked in August, acid and immature					[3] *49*						110
Picked in November, commercial picking; slightly acid, immature.					[3] 46						
Picked in January; pleasantly tart, watery					[3] 47						
Homosassa; average, 6 oranges; Florida; dye titration.					[3] 43						52
Homosassa; rough-lemon rootstock; Florida; dye titration.					[3] 40–51						17
Homosassa; sour orange rootstock; Florida; dye titration.					[3] 62						17

---

[3] Values per 100 ml.

Vitamin values per 100 grams of edible portions of foods—Continued

Item (1)	Description of sample (2)	Vitamin A value (3a)	Vitamin A value (3b)	Thiamin (vitamin B_1) (4a)	Thiamin (vitamin B_1) (4b)	Ascorbic acid (vitamin C) (5a)	Ascorbic acid (vitamin C) (5b)	Vitamin D (6a)	Vitamin D (6b)	Riboflavin (7a)	Riboflavin (7b)	References (8)
		I. U.	*I. U.*	*Mcg*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
Citrus fruit—Con. Sweet orange—Con.	Homosassa; sweet orange rootstock; Florida; dye titration.					[3] 42–59						17
	Indian River; sour orange rootstock; Florida; dye titration.					[3] 36–63						17
	Indian River; average and range, 25 samples from a single grove; Florida; dye titration.					[3] 42 [3] 32–54						17
	Jaffa; rough-lemon rootstock; Florida; dye titration.					40–46						17
	Jaffa; rough-lemon rootstock; Florida; dye titration:											
	Picked in September, very acid and immature					[3] *49*						110
	Picked in January, fruit damaged by December freeze.					[3] *48*						
	Jaffa; sweet orange rootstock; Florida; dye titration.					[3] 42–51						17
	Jaffa variety; range, 5 samples; dye titration					[3] 33. 3–53. 7						200
	Joppa; dye titration:											
	Florida					[3] 45						181
	Texas					[3] 47						
	Joppa; average for all determinations regardless of location or season; dye titration.					[3] 46. 9						181
	Lue Gim Gong; sour orange rootstock; Florida; dye titration.					[3] 51–61						17
	Lue Gim Gong; sour orange rootstock; Florida; dye titration:											
	Picked in December, very acid					[3] *61*						110
	Picked in March, commercial picking; pleasantly tart.					[3] 54						
	Picked in July; pleasantly tart					[3] *29*						
	Lue Gim Gong; sour orange rootstock; picked in April; average and range, 25 oranges; Florida; dye titration:											
	Fruit picked from outer branches of tree					[3] **48** [3] **38–59**						110
	Fruit picked from shaded parts of tree					[3] **42** [3] **27–52**						
	Majorca; average, 6 oranges; Florida; dye titration					[3] 43						52
	Majorca; sweet orange rootstock; Florida; dye titration.					[3] 46						17
	Mediterranean; rough-lemon rootstock; Florida; dye titration.					[3] 62						17

Mediterranean; sweet orange rootstock; Florida; dye titration.					[3] 55						17
Navel; average and range, 15 samples; California; dye titration.					[3] 58 [3] 50–68						50
Navel; fancy; California; dye titration					[3] 61						217
Navel; Washington, D. C., market; California; rat-growth method.	[3] ca 250										29
Navel; dye titration:											
California					[3] 58						181
Texas					[3] 41						
Navel; sweet orange rootstock; Florida; dye titration.					[3] 55						17
Navel; range, 3 locations; Texas; dye titration					[3] 36.6–44.8						181
Navel; average for all determinations regardless of location or season; dye titration.					[3] 41.1						181
Texas Navel (seedless); average and range, 2 samples; Texas; dye titration.					46.1 43.5–48.6						85
Washington Navel; average, 15 samples of 6 oranges each; California; dye titration.					[3] 58						52
Washington Navel (seedless); 2 samples; Texas; dye titration.					29.2 30.3						85
Washington Navel; freshly picked; Western Australia; dye titration.					39						123
do					49						123
Navel; dye titration					48.0						34
Parson Brown; grapefruit rootstock; Florida; dye titration.					[3] 45–51						17
Parson Brown; rough-lemon rootstock; Florida; dye titration.					[3] 33–51						17
Parson Brown; rough-lemon rootstock; Florida; dye titration:											
Picked in August, acid and immature					[3] *52*						110
Picked in November, commercial picking; pleasantly tart and watery.					[3] 48						
Picked in January, very insipid and watery					[3] *43*						
Parson Brown; sour orange rootstock; Florida; dye titration:											
Picked in August, acid and immature					[3] *61*						
Picked in November, commercial picking; pleasantly tart.					[3] 58						
Picked in January, sweet					[3] *56*						
Parson Brown; sour orange rootstock; Florida; dye titration.					[3] 38–64						17
Parson Brown; Florida; rat-growth method	[3] 42										29
do	[3] 80										
Pineapple; average and range, 9 samples; Florida; dye titration.					[3] 51 [3] 38–61						50

---

[3] Values per 100 ml.

Vitamin values per 100 grams of edible portions of foods—Continued

Item	Description of sample	Vitamin A value		Thiamin (vitamin B₁)		Ascorbic acid (vitamin C)		Vitamin D		Riboflavin		References
(1)	(2)	(3a)	(3b)	(4a)	(4b)	(5a)	(5b)	(6a)	(6b)	(7a)	(7b)	(8)
Citrus fruit—Con.		*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
Sweet orange—Con.	Pineapple; rough-lemon rootstock; Florida; dye titration:											
	Picked Aug. 30, very acid and immature					[3]48						110
	Picked in January, commercial picking; pleasantly tart.					[3]44						
	Picked in March, sweet and watery					[3]42						
	Pineapple; dye titration:											
	Fresh, north Florida					[3]55						89
	After 1 month storage at 42° F						[3]68					
	Fresh; range, 4 samples; central Florida					[3]53-75						
	After 1 month storage at 42° F., 2 samples						[3]52 [3]91					
	Fresh; range, 3 samples; east coast of Florida					[3]65-70						
	After 1 month storage at 42° F						[3]53-81					
	Pineapple; rough-lemon rootstock; Florida; dye titration.					[3]46-68						17
	Pineapple; sour orange rootstock; Florida; dye titration.					[3]42-74						17
	Pineapple; sweet orange rootstock; Florida; dye titration.					[3]40						17
	Pineapple; average and range, 6 lots of 5 oranges each; Florida; dye titration.					[3]49 [3]42-54						52
	Pineapple; Florida; dye titration:											
	Average, 6 oranges					[3]51						52
	Average, 5 oranges					[3]62						
	Pineapple; Florida; rat-growth method	[3]48										29
	do	[3]75										29
	do	[3]ca 170										29
	Pineapple; dye titration:											
	Florida					[3]52						181
	Texas					[3]55						
	Pineapple; average for all determinations regardless of location or season; dye titration.					[3]54.2						181
	Pineapple; range, samples from 3 locations; Texas; dye titration.					[3]47.3-62.3						181
	Ruby (Blood); average, 6 oranges; Florida; dye titration.					[3]37						52
	Sanford; Mediterranean; average 6 oranges; Florida; dye titration.					[3]51						52
	Sautgur; India; dye titration					69						245

"Sixteen to One"; rough-lemon rootstock; Florida; dye titration:											
Picked in August, tart and immature					[3]*52*						110
Picked in September, commercial picking; tart, watery, and immature.					[3]49						
Picked in January, slightly tart and watery					[3]*50*						
"Sixteen to One"; rough-lemon rootstock; Florida; dye titration.					[3]46–54						17
Spanish Burriana; range, 6 samples; dye titration					[3]52. 2–66. 0						200
Sweet Seville; sweet orange rootstock; Florida; dye titration.					[3]46						17
Valencia; California; dye titration:											
Average and range, 18 samples					[3]40 [3]33–55						50
Average and range, 7 samples					[3]45 [3]38–53						
Valencia; California; dye titration:											
Choice					[3]39						217
Fancy					[3]43						
Valencia; average, 16 lots of 6 oranges each; California; dye titration.					[3]40						52
Valencia; dye titration:											
California					[3]40						181
Florida					[3]47						
Texas					[3]42						
Valencia; Cleopatra rootstock; Florida; dye titration:											
Picked in November, acid and immature					[3]*50*						110
Picked in March, commercial picking; pleasantly tart.					[3]31						
Picked in June, sweet					[3]*29*						
Valencia; Cleopatra rootstock; Florida; dye titration.					[3]42–55						17
Valencia; grapefruit rootstock; Florida; dye titration:											
Picked in November, acid and immature					[3]*47*						110
Picked in March, commercial picking; pleasantly tart.					[3]39						
Picked in June, very sweet					[3]*31*						
Valencia; grapefruit rootstock; Florida; dye titration.					[3]42–60						17
Valencia; Lue Gim Gong rootstock; Florida; dye titration.					[3]58						17
Valencia; rough-lemon rootstock; Florida; dye titration:											
Picked in November, acid and immature					[3]*41–57*						110
Picked in March, commercial picking; pleasantly tart.					[3]24–31						
Picked in June, sweet and watery					[3]*28–31*						

Values per 100 ml.

Vitamin values per 100 grams of edible portions of foods—Continued

Item (1)	Description of sample (2)	Vitamin A value (3a)	Vitamin A value (3b)	Thiamin (vitamin B_1) (4a)	Thiamin (vitamin B_1) (4b)	Ascorbic acid (vitamin C) (5a)	Ascorbic acid (vitamin C) (5b)	Vitamin D (6a)	Vitamin D (6b)	Riboflavin (7a)	Riboflavin (7b)	References (8)
Citrus fruit—Con. Sweet orange—Con.	Valencia; rough-lemon rootstock; young trees; Florida; dye titration:	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
	Picked in November, acid and immature	----	----	----	----	[3]*49*	----	----	----	----	----	110
	Picked in March, commercial picking; pleasantly tart.	----	----	----	----	[3]30	----	----	----	----	----	
	Picked in June, sweet and watery	----	----	----	----	[3]*29*	----	----	----	----	----	
	Valencia; rough-lemon rootstock; picked in April; average and range, 25 oranges; Florida; dye titration:											
	Fruit picked from outer branches of tree	----	----	----	----	[3]**34** [3]**27–42**	----	----	----	----	----	110
	----do	----	----	----	----	[3]**41** [3]**33–52**	----	----	----	----	----	
	Fruit picked from shaded parts of tree	----	----	----	----	[3]**23** [3]**17–30**	----	----	----	----	----	
	----do	----	----	----	----	[3]**30** [3]**19–39**	----	----	----	----	----	
	Valencia; rough-lemon rootstock; Florida; dye titration.	----	----	----	----	[3]33–55	----	----	----	----	----	17
	Valencia; sour orange rootstock; Florida; dye titration:											
	Picked in November, acid and immature	----	----	----	----	[3]*47*	----	----	----	----	----	110
	Picked in March, commercial picking; pleasantly tart.	----	----	----	----	[3]27	----	----	----	----	----	
	Picked in June, sweet	----	----	----	----	[3]*30*	----	----	----	----	----	
	Picked in November, acid and immature	----	----	----	----	[3]*54*	----	----	----	----	----	
	Picked in April, commercial picking; pleasantly tart.	----	----	----	----	[3]38	----	----	----	----	----	
	Picked in June, sweet	----	----	----	----	[3]*36*	----	----	----	----	----	
	Picked in December, very acid	----	----	----	----	[3]*63*	----	----	----	----	----	
	Picked in March, commercial picking; pleasantly tart.	----	----	----	----	[3]49	----	----	----	----	----	
	Picked in July, pleasantly tart	----	----	----	----	[3]*30*	----	----	----	----	----	
	Valencia; sour orange rootstock; picked in April; average and range, 25 oranges; Florida; dye titration:											

Fruit picked from outer branches of tree					**[3] 56** **[3] 45–84**						110
do					**[3] 52** **[3] 43–58**						
Fruit picked from shaded parts of tree					**[3] 45** **[3] 34–53**						
do					**[3] 40** **[3] 27–48**						
Valencia; sour orange rootstock; Florida; dye titration:					[3] 36–63						17
Valencia; sweet orange rootstock; Florida; dye titration											
Picked in November; acid, immature					[3] 38						110
Picked in March, commercial picking; pleasantly tart.					[3] 28						
Picked in June, sweet					[3] 29						
Valencia; sweet orange rootstock; Florida; dye titration.					[3] 36–37						17
Valencia; Florida; dye titration:											
Average and range, 6 lots of 5 oranges each					[3] 32 [3] 30–33						52
Average, 7 lots of 6 oranges each					[3] 45						
Valencia; dye titration:											
Central Florida, 1 sample					[3] 48						89
North Florida, 7 samples					[3] 33–50						
Valencia; 2 samples; Spain; dye titration					[3] 50.0						200
Valencia; freshly picked; western Australia; dye titration.					44						123
do					68						123
Valencia; range, 5 locations; Texas; dye titration					[3] 40–44.6						181
Valencia; average and range, 4 samples; Texas; dye titration.					37.0 35.7–37.8						85
Valencia; Texas; dye titration:											
April					[3] 38.2						181
February					[3] 42.5						
Valencia; average for all samples regardless of location or season; dye titration.					[3] 42.3						181
Average and range; Argentina; dye titration					[3] 77 [3] 53–90						216
Sweet orange; Brazil; dye titration:											
Average and range, 4 samples					**[3] 40** **[3] 40–42**						9
After 1 month at room temperature; average, 2 samples.						**[3] 27**					
Sweet orange; Brazil; dye titration					[3] 57						9
do					[3] 59						9
Range, 2 samples; Brazil; dye titration					[3] 52.6–62.5						200
Range, 4 samples; California; dye titration					[3] 63.2–70.6						200
California; dye titration					47						10
Fiji; dye titration					70.4						26

---

[3] Values per 100 ml.

Vitamin values per 100 grams of edible portions of foods—Continued

Item (1)	Description of sample (2)	Vitamin A value (3a)	Vitamin A value (3b)	Thiamin (vitamin B_1) (4a)	Thiamin (vitamin B_1) (4b)	Ascorbic acid (vitamin C) (5a)	Ascorbic acid (vitamin C) (5b)	Vitamin D (6a)	Vitamin D (6b)	Riboflavin (7a)	Riboflavin (7b)	References (8)
Citrus fruit—Con.												
Sweet orange—Con.	Unnamed seedlings; rough lemon rootstock; Florida; dye titration:	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
	Picked in August, very acid and immature					[3] 58						110
	Picked in January, commercial picking; pleasantly tart.					[3] 59						
	Picked in March, very sweet and slightly aged					[3] 53						
	Unknown variety; rough-lemon rootstock; Florida; dye titration.					[3] 54–62						17
	Seedling; Florida; dye titration					[3] 36–66						17
	Florida; rat-growth method			78								28
	Florida; dye titration					[3] 40.3						172
	do					36.0						34
	do					48.6						10
	India; dye titration:											
	Fresh					51.5						211
	After 24 hours at room temperature						61.6					
	After 16 days at room temperature						47.8					
	India; dye titration					31.2						1
	Juice; Japan; dye titration:											
	Fruit grown on top of hill, sunny side of tree					29.1						185
	Fruit grown on top of hill, shady side of tree					27.4						
	Fruit grown on middle of hill, sunny side of tree.					28.4						
	Fruit grown on middle of hill, shady side of tree.					24.4						
	Fruit grown at bottom of hill, sunny side of tree.					27.5						
	Fruit grown at bottom of hill, shady side of tree.					23.1						
	Java; dye titration					[3] 72.9						244
	Palestine; dye titration:											
	Average and range, 4 samples					[3] 58 [3] 53–63						9
	After 1 month at room temperature; average, 2 samples.						[3] 52					
	South Africa; dye titration:											
	Average and range, 4 samples					[3] 57 [3] 34–68						9
	After 1 month at room temperature; average, 2 samples.						[3] 53					
	Average, 2 samples; South Africa; dye titration					[3] 76.9						200

	Seedless; average and range, 4 samples; Spain; dye titration.					[3] 62 [3] 55–66						9
	Spain; dye titration:											
	Average, 4 samples					[3] **89**						9
	After 1 month at room temperature; average 2 samples.						[3] **71**					
	Seedless; Spain; dye titration:											
	Average and range, 3 samples					[3] **54** [3] **50–59**						9
	After 1 month at room temperature, 1 sample						[3] **51**					
	U. S. A.; dye titration					60						22
	Dye titration					[3] 34.8						146
	do					[3] 50.0						102
	do					[3] 82.5						58
	Average and range, 53 samples; dye titration					[3] 44.8 [3] 19.6–76.9						200
	Average and range; dye titration					58 33–77						202
	Dye titration					47						255
	Rat-growth method									27.8		157
	U. S. A.; dye titration					[3] 72.6						68
	Average and range; U. S. A.; dye titration:											
	Fresh juice					[3] **38** [3] **37–38**						168
	Juice held 1 day in refrigerator at 40°–50° C						[3] **37** [3] **36–37**					
	Juice held 4 days in refrigerator at 40°–50° C						[3] **35** [3] **34–36**					
	Juice; dye titration:											
	Stored 5 hours at 6° C						[3] **51**					254
	Stored 5 hours at 38° C						[3] **46**					
	Thiochrome method			111								209
	do			102								210
Tangelo orange	Clement; large size; average, 3 fruits; Florida; dye titration.					[3] 64						52
	Minneola; average and range, 6 lots of 4–5 fruits each; Florida; dye titration.					[3] 22 [3] 19–27						52
	Minneola; large size; Florida; dye titration					[3] 27						52
	Minneola; medium size; average, 4 fruits; Florida; dye titration.					[3] 22						52
	Orlando; average, 5 fruits; Florida; dye titration					[3] 35						52
	Sampson; Florida; dye titration					[3] 28						52
	Seminole; average and range, 6 lots of 4 fruits each; Florida; dye titration.					[3] 18 [3] 15–20						52
	Temple Orange; rough lemon rootstock; Florida; dye titration.					[3] 42						17
	do					[3] 64						17
	Temple Orange; sour orange rootstock; Florida; dye titration.					[3] 53–72						17

---

[3] Values per 100 ml.

Vitamin values per 100 grams of edible portions of foods—Continued

Item	Description of sample	Vitamin A value		Thiamin (vitamin B_1)		Ascorbic acid (vitamin C)		Vitamin D		Riboflavin		References
(1)	(2)	(3a)	(3b)	(4a)	(4b)	(5a)	(5b)	(6a)	(6b)	(7a)	(7b)	(8)
		I. U.	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
Citrus fruit—Con. Tangelo orange—Continued.	Temple Orange; dye titration:											
	Florida					[3] 57						181
	Texas					[3] 52						
	Temple Orange; average and range, 4 samples; Texas; dye titration.					38.6 32.1–48.8						85
	Temple Orange; average for all determinations regardless of location or season; dye titration.					[3] 52.4						181
	Thornton; average and range, 6 lots of 5–6 fruits each; Florida; dye titration.					[3] 33 [3] 29–37						52
	Thornton; Florida; dye titration					[3] 43						52
	Umatilla; Tangor; average and range, 6 lots of 3 fruits each; Florida; dye titration.					[3] 40 [3] 35–53						52
	Wekiwa; small size; average, 6 fruits; Florida; dye titration.					[3] 43						52
Tangerine orange	Mandarin; average and range; Argentina; dye titration.					[3] 54 [3] 50–60						216
	Mandarin; sour orange rootstock; Florida; dye titration.					[3] 26						17
	do					[3] 31						17
	Mandarin; freshly picked; western Australia; dye titration.					51						123
	Clementine; average, 6 fruits; Florida; dye titration.					[3] 37						52
	Dancy; average and range, 6 lots of 5–6 fruits each; Florida; dye titration.					[3] 24 [3] 20–27						52
	Dancy; average, 6 fruits; Florida; dye titration					[3] 18						52
	Algeria; dye titration					[3] 73						9
	do					[3] 78						9
	Washington, D. C., market; Florida; rat-growth method.	[3] ca 348										29
	Rough lemon rootstock; Florida; dye titration					[3] 19–27						17
	Florida; dye titration					[3] 27						17
	do					[3] 30						17
	India; dye titration					31.5						1
	Average and range, 3 samples; Jamaica; dye titration.					[3] 15 [3] 10–20						9
	Average and range, 4 samples; Spain; dye titration.					[3] 33 [3] 31–36						9
	Pulp; bradycardia method			120								11
	Dye titration					48.4						34
	do					[3] 20.8						102

	Juice; stored 5 hours; dye titration:											
	Stored at 6° C						**[3] 39**					254
	Stored at 38° C						**[3] 33**					
	Dye titration					50						255
	Juice; commercial sample; dairy beverage type; dye titration:											
	Fresh					**[3] 14.8**						222
	After storage 1 week at 7° C						**[3] 12.1**					
Citrus fruit, canned juice:												
Grapefruit	Commercial sample; U. S. A.; dye titration:											
	Freshly opened					**[3] 16.5**						222
	After storage 1 week at 7° C						**[3] 9.6**					
	Freshly opened					**[3] 3.6**						
	After storage 1 week at 7° C						**[3] 1.1**					
	Sweetened; commercial sample					[3] 36.0						4
	Commercially canned; average and range, several brands; dye titration.					[3] 37 [3] 29–42						3
	Commercial samples; U. S. A.; dye titration:											
	In tin containers; average and range, 3 samples					43 33–54						199
	In glass containers, 1 sample					39						
	Unsweetened commercial sample					[3] 35.2						4
	Commercial sample; U. S. A.; dye titration					[3] 41.0						102
	Rat-growth method									11.8		157
Lemon	Commercially canned; average and range, 3 brands; dye titration.					[3] 52 [3] 41–58						3
	Commercial carbonated; U. S. A.; dye titration					[3] 0.36						222
Orange	Florida market samples; dye titration					[3] 37.7						172
	U. S. A.; dye titration					[3] 29.4						102
	Commercially canned; average and range, 8 brands; U. S. A.; dye titration.					[3] 44 [3] 31–56						3
	Commercial samples; dye titration:											
	In tin containers; 2 samples					29 46						199
	In glass containers; 2 samples					9.7 43						
Citrus fruit, various parts:												
Grapefruit	Dye titration:											
	Juice					37.4						58
	Peel					265.0						
	Pulp					37.3						
Lemon	Dye titration:											
	Yellow outer skin					210						9
	Inner thick white skin					46						
	Whole peel					100						
	Juice					[3] 100						
	Dye titration:											
	Juice					38.7						58
	Peel					101						
	Pulp					32.1						

[3] Values per 100 ml.

Vitamin values per 100 grams of edible portions of foods—Continued

Item (1)	Description of sample (2)	Vitamin A value (3a)	Vitamin A value (3b)	Thiamin vitamin B_1) (4a)	Thiamin vitamin B_1) (4b)	Ascorbic acid (vitamin C) (5a)	Ascorbic acid (vitamin C) (5b)	Vitamin D (6a)	Vitamin D (6b)	Riboflavin (7a)	Riboflavin (7b)	References (8)
Citrus fruit, various parts—Con.												
Lime	Unripe fresh fruit; India; dye titration:	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
	Juice					68.1						211
	Peel					63.9						
	Ripe fruit; India; dye titration:											
	Juice					39.6						211
	Peel					115.1						
	Very ripe and old fruit; India; dye titration:											
	Juice					23.8						211
	Peel					120.6						
Orange	Seville variety; underripe; Spain; dye titration:											
	Cortex portion					[3] 31.2						200
	Peel					97.5						
	Cortex portion					[3] 27.8						
	Peel					90.9						
	Seville variety; medium ripe; Spain; dye titration:											
	Cortex portion					[3] 45.4						200
	Peel					166.7						
	Seville variety; very ripe; Spain; dye titration:											
	Cortex portion					[3] 45.5						200
	Peel					285.7						
	Seville; dye titration:											
	Outer yellow skin					220						9
	Thick white inner skin					72						
	Whole peel					190						
	Juice					[3] 46						
	Outer yellow skin					180						
	Thick white inner skin					77						
	Whole peel					86						
	Juice					[3] 22						
	Sweet orange; dye titration:											
	Outer yellow skin					130						9
	Thick white inner skin					69						
	Whole peel					101						
	Juice					[3] 72						
	Tight skin variety; India; dye titration:											
	Juice					102.8						211
	Peel					156.0						

	Loose skin variety; ripe; India; dye titration:											
	Juice					62.7						211
	Peel					131.3						
	Loose skin variety; very ripe; India; dye titration:											
	Juice					34.5						211
	Peel					108.8						
	Loose skin variety; unripe; India; dye titration:											
	Juice					70.5						211
	Peel					105.6						
	Dye titration:											
	Juice					82.3						58
	Peel					193.0						
	Pulp					63.2						
	Peel; Seville; dye titration					96						9
	do					96						9
	do					120						9
	Peel; India; dye titration					1.2						1
Tangerine	Dye titration:											
	Whole peel					69						9
	Juice					[3] 15						
Clam	Cherrystone; raw; Atlantic; rat-growth method	200										29
	Razor Shell; China; dye titration					5.70						41
	Whole; 72.1 percent moisture; Japan; lumiflavin method.									119.3		248
	Spawn and viscera; Japan; lumiflavin method									549.8		248
Cocoa	Commercial sample; U. S. A. market; rat-growth method.			ca 75								28
	From English markets; thiochrome method			Nil								209
Coconut: Flesh	India; dye titration					1.8						38
	do					0.8						211
	Thiochrome method			30								209
	Green; India; dye titration					*3.4*						1
	Dried; bradycardia method				Trace							11
Milk	From fresh green coconut; India; dye titration					*1.66*						1
	From ripe coconut; India; dye titration					5.0						1
	From green coconut; India; dye titration					[3] *1.8*						38
	India; dye titration					2.0						211
	Thiochrome method			Nil								209
Cod	Fillet; fresh; Germany; chromatographic-colorimetric method.									45.8–50.9		233
	Greenland; dye titration					2						134
	Muscle and skin; 81 percent moisture; Japan; lumiflavin method.									84.1		248
	Muscle; raw; bradycardia method			120								11
	Thiochrome method			Nil								209
Various organs (see liver).	Spawn; 40 percent moisture; Japan; lumiflavin method.									315.7		248
Cod roe (see Roe, cod).												

[3] Values per 100 ml.

Vitamin values per 100 grams of edible portions of foods—Continued

Item	Description of sample	Vitamin A value		Thiamin (vitamin B_1)		Ascorbic acid (vitamin C)		Vitamin D		Riboflavin		References
(1)	(2)	(3a)	(3b)	(4a)	(4b)	(5a)	(5b)	(6a)	(6b)	(7a)	(7b)	(8)
		I. U.	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
Coffee	Dye titration					0						43
Collards	Washington, D. C., market; Florida; rat-growth method:											
	Raw	**[5] 8,800**										29
	Cooked		**[4] 12,200**									
	Washington, D. C., market; rat-growth method			201								28
Coriander:												
Leaves	India; dye titration:											
	Fresh					**69.0**						211
	After 24 hours at room temperature						**28.5**					
	After 6 days at room temperature						**4.8**					
	India; fluorometric method									1,120		195
	India; dye titration					135.2						211
Seeds	India; dye titration					Nil						211
Corn:												
Field:												
Endosperm	Yellow variety; U. S. A.; spectrophotometric analysis:											
	Geno-type YYY	[1] 218										141
	Geno-type *YYy*	[1] 132										
	Geno-type *Yyy*	[1] 70										
	Geno-type *yyy*	[1] 18										
Mature dry grain	Fermentation method:											
	Cassel White Dent; Kansas			610								235
	Colby Yellow Cap; Kansas			500								
	Commercial White; Kansas			550								
	Dakota White Flint; North Dakota; obtained Washington, D. C.			600								
	Duncan; (Yellow); obtained Michigan			580								
	Garrick Prolific; (White); South Carolina; obtained Washington, D. C.			470								
	Gehu Yellow Flint; North Dakota; obtained Washington, D. C.			800								
	Golden King; (Yellow); Iowa; obtained Washington, D. C.			600								
	Hays Golden; (Yellow); Kansas			600								
	Iowa Hybrid 939; (Yellow); Nebraska; obtained Kansas.			460								
	Krug; (Yellow); Iowa; obtained Washington, D. C.			480								

	M. A. C. Yellow Dent; obtained Washington, D. C.			470								235
	Midland Yellow Dent; Kansas			510								
	Minnesota No. 13; (Yellow); Minnesota			560								
	Northwestern Dent; (Yellow); obtained Washington, D. C.			500								
	Pickett; (Yellow); obtained Michigan			410								
	Pride of Saline; (White); Kansas			600								
	Reid Yellow Dent; Indiana; chromatographic-spectrophotometric method.	[1] 140										36
	Fermentation method:											
	Reid Yellow Dent; Kansas			550								235
	Reid Yellow Dent; Ohio; chromatographic-spectrophotometric method.	[1] 93										36
	Fermentation method:											
	Rustler White Dent; Minnesota			580								235
	U. S. hybrid 13; (Yellow); Ohio; obtained Kansas.			410								
	U. S. hybrid 44; (Yellow); Illinois; obtained Kansas.			460								
	Whatley Prolific; (White); Georgia; obtained Washington, D. C.			450								
	Yellow Selection No. 1; obtained Kansas			530								
Miscellaneous [9]	Yellow, Argentine; chromatographic-spectrophotometric method.	[1] 118										36
	Holland; thiochrome method			400								288
	India; dye titration:											
	Dry seeds					2.1						197
	After 24-hour germination						3.1					
	After 48-hour germination						8.7					
	After 96-hour germination						10.5					
	White maize; mature; India; fluorometric method									309		195
	Yellow; Indiana; chromatographic-spectrophotometric method.	[1] 56										36
	Yellow; New Jersey; chromatographic-spectrophotometric method.	[1] 80										36
	Yellow; average, 3 lots; U. S. A.; rat-growth method.	[1] 220										104
	Whole-grain; fluorometric method									100		67
	Whole-grain:											
	Rat-growth method									290		163
	Reduction method									320		
Popcorn	Popped; Indiana; rat-growth method		[2] ca 500									29
Sweet	Country Gentleman; U. S. A.; rat-growth method			120								28
	Golden Bantam; Boston Market; spectrographic method.	[1] 2, 500										82
	Golden Bantam; Massachusetts; field fresh; dye titration.					6–12						63

[1] International Unit values were calculated from carotene analyses or included carotene analyses.

[2] Values on cooked- or processed-weight basis.

[4] Values on raw-weight basis.

[5] This fiure may be significantly affected by method ofs ampling because of oxidative enzymes.

[9] Items under this caption are assumed to be samples of dry field corn.

Vitamin values per 100 grams of edible portions of foods—Continued

Item	Description of sample	Vitamin A value		Thiamin (vitamin B₁)		Ascorbic acid (vitamin C)		Vitamin D		Riboflavin		References
(1)	(2)	(3a)	(3b)	(4a)	(4b)	(5a)	(5b)	(6a)	(6b)	(7a)	(7b)	(8)
Corn—Continued.												
Sweet—Continued.	Golden Bantam; Massachusetts; dye titration:	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
	Field fresh					9						63
	Cooked						[2] 8					
	Frozen						[2] 8					
	Canned, cream style						[2] 7					
	Canned, whole kernel						[2] 8					
	Fresh, blanched					5						
	Stored 34 days at 23.3° C						6					
	Fresh					8.9						
	Cooked 12 minutes in boiling water						[2] 8.3					
	Fresh					14						
	Corn in husk held in refrigerator 1 day at 4.4°C						12					
	Corn in husk held 3 days in refrigerator						9					
	Corn in husk held 1 day at room temperature						13					
	Corn in husk held 3 days at room temperature						8					
	Corn in husk held 4 days at room temperature						7					
	Golden Bantam; Montana; rat-growth methods and dye titration, respectively:											
	Raw	280		198								219
	Dried, soaked, and cooked 30 minutes		[2] 280		[2] 54		[2] 5.5					
	Preserved by salting, soaked, and cooked		[2] 280		[2] 54		[2] 6.9					
	Preserved by fermentation in brine, soaked, and cooked.		[2] 500		[2] 27		[2] 6.8					
	Canned with pressure cooker, 75 minutes at 250° F.		[2] 120		[2] 54		[2] 14.4					
	Canned as above and heated 20 minutes						[2] 8.1					
	Golden Bantam; market sample; U. S. A.; dye titration.					42.8						34
	Golden Bantam; U. S. A.; rat-growth method			150								28
	Stowell's Evergreen; market sample; U. S. A.; dye titration.					10.8						34
	Germany; dye titration:											
	Fresh					13.5						59
	Canned						[4] 2.9					
	Massachusetts; dye titration:											
	Field fresh					9						63
	Market					9						
	Massachusetts; Aug. 15–Oct. 6; dye titration					6.1–11.6						82

Canned	White; commercially canned, cream style, 4 brands; U. S. A.; dye titration.					7-10						63
	White; commercially canned; U. S. A.; dye titration:											
	Freshly opened					8.0						63
	Reheated to boiling, held 1 minute						[2] 7.6					
	White; commercially canned, cream style; U. S. A.; dye titration:											
	Freshly opened					8						63
	Opened and held in refrigerator 1 day at 4.4° C						8					
	Opened and held in refrigerator 4 days at 4.4° C						4					
	Whole kernel; commercially canned; average, 2 brands; U. S. A.; dye titration.					8						63
	Whole kernel; vacuum packed, commercially canned; average, 3 brands; U. S. A.; dye titration.					10						63
	Whole kernel; lye treated; commercially canned; U. S. A.; dye titration.					3						63
	Commercial; whole kernel; U. S. A.; dye titration					8						63
	Yellow; commercial sample; U. S. A.; dye titration:											
	Freshly opened					7.0						63
	Reheated to boiling, held 1 minute						[2] 6.4					
	Yellow; commercially canned; U. S. A.; dye titration:											
	Freshly opened					7						63
	Opened and held in refrigerator 1 day at 4.4° C						7					
	Opened and held in refrigerator 4 days at 4.4° C						5					
	Yellow; commercially canned, cream style, 1 brand; U. S. A.; dye titration.					7						63
	Commercial samples; U. S. A.; dye titration:											
	Canned in tin; average and range, 7 samples					2.7 0.8-7						199
	Canned in glass; average and range, 3 samples					3 0.7-6						
Frozen	Country Gentleman; whole kernel, commercially frozen; dye titration.					9						63
	Golden Bantam; Boston market; spectrographic method.	[1] 2, 600										82
	Golden Bantam; whole kernel; Massachusetts; dye titration:											
	Without storage					10						63
	Stored 34 days at −23.3° C						10					
	Golden Bantam; "corn-on-cob"; Massachusetts; dye titration:											
	Without storage					10						63
	Stored 34 days at −23.3° C						10					

---

[1] International Unit values were calculated from carotene analyses or included carotene analyses.
[2] Values on cooked- or processed-weight basis.
[4] Values on raw-weight basis.

Vitamin values per 100 grams of edible portions of foods—Continued

Item (1)	Description of sample (2)	Vitamin A value (3a)	Vitamin A value (3b)	Thiamin (vitamin B₁) (4a)	Thiamin (vitamin B₁) (4b)	Ascorbic acid (vitamin C) (5a)	Ascorbic acid (vitamin C) (5b)	Vitamin D (6a)	Vitamin D (6b)	Riboflavin (7a)	Riboflavin (7b)	References (8)
		I. U.	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
Corn—Continued. Sweet—Con. Frozen—Con.	Golden Cross Bantam; 2 commercial samples; U. S. A.; rat-growth method:											
	Stored at 0° F		100 110									297
	Stored at −40° F		130 200									
	"On-the-cob"; average and range; harvested Aug. 28–Sept. 24; commercially frozen; U. S. A.; dye titration.					9.5 9–12.5						82
	"Corn-on-cob"; commercial sample; U. S. A.; dye titration.					10						82
	Whole kernel; commercial sample; U. S. A.; dye titration:											
	Uncooked					8.2						63
	After cooking 4 minutes in boiling water						[2] 7.6					
	Whole kernel; harvested Aug. 22–Sept. 24; commercially frozen; average and range; U. S. A.; dye titration.					9.0 7–11						82
Sweet or immature field	Indian corn; young ears; India; dye titration					8.05						1
	Indian maize; fairly tender; India; dye titration					3.5						211
	Yellow; India; fluorometric method									36		291
	Young ears; India; fluorometric method									50		291
	Maize; U. S. A.; fluorometric method:											
	Roasting-ear stage									121		126
	Mature roasting-ear stage									71		
	"On the cob"; thiochrome method			144								209
Corn flakes	Commercial product; U. S. A; rat-growth method			Trace								28
Corn flour	Thiochrome method			Nil								209
Corn meal	White; small amount of bran removed in milling; U. S. A.; rat-growth method.			303								28
	Lancaster; whole-ground grain; Maryland; rat-growth method.	333										29
	Yellow; small amount of bran removed in milling; U. S. A.; rat-growth method.			234								28
	U. S. A.:											
	Bioassay									1,070		250
	Fluorometric method									450		

Corn salad	Leaves of common German variety; modified dye titration.	----	----	----	----	85	----	----	----	----	----	32
Cowpea	Immature, grown on sandy loam soil, fertilized with superphosphate and muriate of potash; Alabama; spectrophotometric method:											
	Delsta	[1] 775	----	----	----	----	----	----	----	----	----	240
	FPI No. 85,667	[1] 775	----	----	----	----	----	----	----	----	----	
	FPI No. 85,384	[1] 771	----	----	----	----	----	----	----	----	----	
	FPI No. 85,076	[1] 770	----	----	----	----	----	----	----	----	----	
	FPI No. 82,213	[1] 765	----	----	----	----	----	----	----	----	----	
	FPI No. 94,168	[1] 753	----	----	----	----	----	----	----	----	----	
	Mammoth, yellow	[1] 753	----	----	----	----	----	----	----	----	----	
	Norredo	[1] 753	----	----	----	----	----	----	----	----	----	
	FPI No. 94,166	[1] 745	----	----	----	----	----	----	----	----	----	
	Mamotan	[1] 735	----	----	----	----	----	----	----	----	----	
	FPI No. 84,785	[1] 735	----	----	----	----	----	----	----	----	----	
	FPI No. 19,977	[1] 728	----	----	----	----	----	----	----	----	----	
	Easy-cook	[1] 716	----	----	----	----	----	----	----	----	----	
	FPI No. 84,734	[1] 716	----	----	----	----	----	----	----	----	----	
	FPI No. 86,022	[1] 716	----	----	----	----	----	----	----	----	----	
	George Washington	[1] 703	----	----	----	----	----	----	----	----	----	
	FPI No. 96,018	[1] 703	----	----	----	----	----	----	----	----	----	
	Peking	[1] 695	----	----	----	----	----	----	----	----	----	
	Virginia black-eye	[1] 385	----	----	----	----	----	----	----	----	----	
	Lady pea	[1] 383	----	----	----	----	----	----	----	----	----	
	Six-week pea	[1] 328	----	----	----	----	----	----	----	----	----	
	Brown crowder	[1] 298	----	----	----	----	----	----	----	----	----	
	Black crowder	[1] 298	----	----	----	----	----	----	----	----	----	
	White crowder	[1] 297	----	----	----	----	----	----	----	----	----	
	California black-eye	[1] 291	----	----	----	----	----	----	----	----	----	
	Cream crowder	[1] 280	----	----	----	----	----	----	----	----	----	
	Dixie green	[1] 233	----	----	----	----	----	----	----	----	----	
	White; fresh; China; dye titration	----	----	----	----	25	----	----	----	----	----	41
Dry	Mature, 6-9 percent moisture, allowed to stay in field until mature, stored 4 months; Alabama; spectrophotometric method:											
	White crowder; 1936 crop	[1] 34.7	----	----	----	----	----	----	----	----	----	240
	White crowder; 1937 crop	[1] 54.7	----	----	----	----	----	----	----	----	----	
	Virginia black-eye; 1937 crop	[1] 45.5	----	----	----	----	----	----	----	----	----	
	Six-week pea; 1937 crop	[1] 42.7	----	----	----	----	----	----	----	----	----	
	Brown crowder; 1937 crop	[1] 42.7	----	----	----	----	----	----	----	----	----	
	Lady Pea; 1936 crop	[1] 69.5	----	----	----	----	----	----	----	----	----	
	Lady Pea; 1937 crop	[1] 40.8	----	----	----	----	----	----	----	----	----	
	Cream crowder; 1936 crop	[1] 54.6	----	----	----	----	----	----	----	----	----	
	Cream crowder; 1937 crop	[1] 40.8	----	----	----	----	----	----	----	----	----	
	Dixie green; 1936 crop	[1] 42.5	----	----	----	----	----	----	----	----	----	
	Black crowder; 1936 crop	[1] 51.5	----	----	----	----	----	----	----	----	----	
	Black-eye; mature seeds; U. S. A.; rat-growth methods.	0	----	1,050	----	----	----	----	----	----	----	105

[1] International Unit values were calculated from carotene analyses or included carotene analyses.

[2] Values on cooked- or processed-weight basis.

Vitamin values per 100 grams of edible portions of foods—Continued

Item	Description of sample	Vitamin A value		Thiamin (vitamin B$_1$)		Ascorbic acid (vitamin C)		Vitamin D		Riboflavin		References
(1)	(2)	(3a)	(3b)	(4a)	(4b)	(5a)	(5b)	(6a)	(6b)	(7a)	(7b)	(8)
		I. U.	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
Cowpea—Con. Dry—Continued.	Brabham; mature seeds; U. S. A.; rat-growth methods.	0		810								105
	Clay; mature seeds; U. S. A.; rat-growth methods	0		1,110								105
	Groit; mature seeds; U. S. A.; rat-growth methods.	50		900								105
	Iron; mature seeds; U. S. A.; rat-growth methods	0		1,050								105
	Small black; mature seeds; U. S. A.; rat-growth methods.	0		840								105
	do			930								105
	Sugar crowder; mature seeds; U. S. A.; rat-growth methods:											
	(Cream)	0		780								105
	(Brown)	50		780								
	Whippoorwill; mature seeds; U. S. A.; rat-growth methods.	0		690								105
	do	0										29
	Average, 9 varieties; mature seeds; U. S. A.; rat-growth method.			900								105
	U. S. A.; rat-growth method			936								28
Crab	Meat; China; dye titration					12.62						41
	Muscle, boiled in salted water; Japan; lumiflavin method.										12.6	248
	Boiled; thiochrome method				Nil							209
Canned	Blue crab; meat; Atlantic			230		.012				150		73
Cracker:												
Graham	Commercial sample; U. S. A.; rat-growth method			75								(6)
	U. S. A.; dye titration					0						43
Soda	Saltines, commercial sample; U. S. A.; rat-growth methods.			110								(6)
	Commercial sample; U. S. A.; rat-growth method			200								(6)
Cranberry	Boston market; spectrographic method	[1]20										82
	Fresh; Germany; modified dye titration					19						32
	New Jersey; rat-growth method	ca 70										29
Frozen	Boston market, commercial sample; spectrographic method.	[1]20										82
Crayfish	Greenland; dye titration					3						134

Cream	Summer produced, 20 percent fat, composite of 3 dairies; Washington, D. C.; rat-growth method.	1, 640										29
	[England] rat-curative method							50				46
	Germany; dye titration					0. 92						279
	Pasteurized; U. S. A.; dye titration					0						43
Cucumber	Chinese; garden fresh; Ohio; dye titration					10. 7						3
	Davis Perfect; Washington market; Florida: rat-growth method.	Nil										29
	Average and range; Argentina; dye titration					4 4–5						216
	England; thiochrome method			45								209
	Peeled; Germany; dye titration					2. 8						229
	With peel; range, 3 samples; Germany; dye titration.					5. 9–9. 0						229
	India; dye titration					6. 9						1
	India; fluorometric method									4		291
	Java; dye titration					6. 9						244
	Rumania; dye titration					11. 5						204
	U. S. A.; rat-growth method			54								(6)
	U. S. A.; fluorometric method									44		126
	Fresh juice; U. S. A.; dye titration					[3] 1. 2						102
Current, black	Baldwin; ripe; average and range, 9 batches from 5 farms; England; dye titration.					261 228–327						201
	Baldwin; average and range; England; dye titration:											
	Ripe, mid-July					245 237–250						201
	Ripe, 1 week later					244 225–261						
	Slightly underripe, mid-July					*276* *256-303*						
	Slightly underripe, 1 week later					*261* *238-289*						
	Edina; ripe; average and range, 3 batches from 3 farms; England; dye titration.					151 108–196						201
	September Black; ripe; average and range, 11 batches from 6 farms; England; dye titration.					259 212–344						201
	September Black; England; dye titration:											
	Ripe, mid-July					249 230–270						201
	Ripe, 1 week later					235 212–258						
	Slightly underripe, mid-July					*270* *250-297*						
	Slightly underripe, 1 week later					*261* *235-280*						

---

[1] International Unit values were calculated from carotene analyses or included carotene analyses.
[2] Values per 100 ml.
[6] Unpublished data, Bureau of Home Economics.

Vitamin values per 100 grams of edible portions of foods—Continued

Item	Description of sample	Vitamin A value		Thiamin (vitamin B₁)		Ascorbic acid (vitamin C)		Vitamin D		Riboflavin		References
(1)	(2)	(3a)	(3b)	(4a)	(4b)	(5a)	(5b)	(6a)	(6b)	(7a)	(7b)	(8)
		I. U.	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
Currant, black—Continued.	Wellington; ripe; average and range, 3 batches from 2 farms; England; dye titration.					228 214–238						201
	Westwick Choice; ripe; average and range, 7 batches from 2 farms; England; dye titration.					257 212–300						201
	Westwick Choice; England; dye titration:											
	Black, nearly ripe, small, late July					*295*						201
	Black, nearly ripe, medium, late July					*295*						
	Black, nearly ripe, large, late July					*244*						
	Black, ripe, small, early August					264						
	Black, ripe, medium, early August					277						
	Black, ripe, large, early August					220						
	Green, unripe, small, early June					*382*						
	Green, unripe, small, 1 week later					*406*						
	Green, unripe, medium, early June					*402*						
	Green, unripe, medium, 1 week later					*419*						
	Green, unripe, large, early June					*366*						
	Green, unripe, large, 1 week later					*361*						
	Denmark; dye titration:											
	Fresh					**160**						138
	Canned						[4] **120**					
	Canned, stored 3 months at 15° C						[4] **69**					
	Canned, stored 6 months at 15° C						[4] **60**					
	Fresh					**130**						
	Canned, stored 6 months at 15° C						[4] **65**					
	Canned, stored 1 year at 15° C						[4] **22**					
	Fresh; range, 2 batches; England; dye titration:											
	Raw					**172.2–220.0**						200
	After cooking in sirup, liquid included						[2] **146.2–206.9**					
	After commercial canning in sirup, liquid included.						[2] **185.4–255.9**					
	Ripe; average and range, 4 batches from 2 farms; England; dye titration.					230 206–258						201
	Fresh; average, 2 batches; England; dye titration					196.1						200
	England; dye titration:											
	Fresh					**165**						202
	Jam made from above						[2] **58**					
	[England]; bradycardia method				0–60							13
	Germany; dye titration					92.6						229
	do					97.5						229

Canned	England; dye titration:											
	0-1 day after commercial canning					186 256						200
	After 35 and 33 weeks storage at room temperature.						170 182					
	Commercially canned; average and range; England; dye titration.						[2] 99 80-152					202
Juice	Denmark; dye titration:											
	Fresh, raw					[3] 90						138
	Pasteurized 30 minutes, 60°-85° C						[3] 71-73					
	Pasteurized 30 minutes, 60°-85° C., stored 7 months.						[3] 62-68					
	Denmark; dye titration:											
	Boiled, filtered hot, pasteurized 30 minutes, 70°-75° C.						[3] 115					
	Stored 7 months at 15° C						[3] 94					
	Boiled, filtered cold, pasteurized 30 minutes, 70°-75° C.						[3] 118					
	Stored 7 months at 15° C						[3] 100					
	Commercial sample, pasteurized; England					[3] 200						39
Current, red	Red Lake; freshly picked; Ohio; dye titration					24.5						34
	England; dye titration:											
	Fresh					30						202
	Jam made from above						[2] 13					
	[England]; bradycardia method			30-60								13
	Range, 6 varieties; Germany; dye titration:											
	Fresh, 12 samples					23.8-45.6						229
	Stored 2 weeks at 2° C., 6 samples						20.0-38.0					
	Germany; dye titration					28.6						279
	do					30.8						279
	Grown near Washington, D. C.; rat-growth method.	ca 120										29
Juice	Commercial sample; pasteurized; England					[3] 48						39
Cuttlefish	Japan; lumiflavin method:											
	Fresh, 88.3 percent moisture									1.0		248
	Pickled, 59.5 percent moisture										1.1	
Dandelion greens	Cultivated, cooked; Washington, D. C., market; Florida; rat-growth method.		[4] ca9,000									29
	Greenland; dye titration					15						134
	Freshly picked; Ohio; dye titration:											
	Spring					154.6						34
	Summer					30.3						
	U. S. A.; chromatographic and spectrophotometric method.	[1] 14,250										187

---

[1] International Unit values were calculated from carotene analyses or included carotene analyses.
[2] Values on cooked- or processed-weight basis.
[3] Values per 100 ml.
[4] Values on raw-weight basis.

Vitamin values per 100 grams of edible portions of foods—Continued

Item	Description of sample	Vitamin A value		Thiamin (vitamin B$_1$)		Ascorbic acid (vitamin C)		Vitamin D		Riboflavin		References
(1)	(2)	(3a)	(3b)	(4a)	(4b)	(5a)	(5b)	(6a)	(6b)	(7a)	(7b)	(8)
Date	Deglet Noor; tree-ripened; California; rat-growth method:	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
	Fresh	66.1										188
	Fumigated		64.8									
	Artificially matured as usually marketed		74.6									
	Deglet Noor; tree-ripened, stored 7 months at 28° F.; California; rat-growth method.		Nil									29
	Hallawi; Asia; rat-growth method:											
	Unpasteurized	66.6										188
	Pasteurized		63.6									
	Hallawi; tree-ripened; California; rat-growth method:											
	Fresh	83.0										188
	Fumigated with CS$_2$		66.6									
	Fumigated, washed, and dried as in commercial method.		41.0									
	Hayany; processed; rat-growth method				72							28
	Saidy; processed 2–3 days at 130° F., stored about 6 months; California; rat-growth method.		ca 350									29
	India; fluorometric method									30		291
	Preserved; India; dye titration						Nil					211
	Preserved; thiochrome method				Nil							209
	Maine market sample; dye titration					0						43
Dock	Curly, leaves; Ohio; dye titration					134.9						35
	Sorrel; leaves; [England]; thiochrome method			75								210
	Sorrel; Ohio; dye titration					176.5						35
Drumstick	India; dye titration					119.6						211
	Pods; India; dye titration					271						245
Duck	Flesh; China; dye titration					7.8						41
Various organs (see Heart, Liver, etc.).												
Eel	*Anguilla aucklandi*; average and range, 7 values; New Zealand; spectrographic method.	[7]4,830 [7]870–10,300										64
	Anguilla vulgaris; Holland and Scotland; spectrographic method:											
	1.26-kg. eel	[7]10,660										64
	1.53-kg. eel	[7]15,830										

	Muscle and skin, 63.9 percent moisture; Japan; lumiflavin method.									87.7		248
	Fresh; Germany; chromatographic and colorimetric method.									55		233
	Thiochrome method			144								209
Various organs (see Liver).												
Egg, hen's, whole	From White Leghorn pullets, reared on range; Ohio; rat-growth method:											
	On basal diet containing 0.8 mcg. riboflavin per gm.										[7] 140	136
	On ration containing 1.50 mcg. riboflavin per gm., supplied by 5-percent dehydrated alfalfa leaf meal.										[7] 210	
	On ration containing 1.60 mcg. riboflavin per gm., supplied by 5-percent dried skim milk.										[7] 240	
	On ration containing 1.90 mcg. riboflavin per gm., supplied by 10-percent dehydrated alfalfa leaf meal.										[7] 320	
	On ration containing 2.30 mcg. riboflavin per gm., supplied by 10-percent dried skim milk.										[7] 440	
	On ration containing 2.20 mcg. riboflavin per gm., supplied by 5-percent alfalfa leaf meal + 5-percent dried skim milk.										[7] 440	
	Vicinity Washington, D. C.; rat-growth method:											
	Summer	[7] 1,460										29
	Winter	[7] 620										
	[England]; thiochrome method			258								209
	Maine market sample; dye titration					0						43
	U. S. A.; dye titration					0						68
Dried	Commercial sample; rat-curative method							220				215
	Commercial sample, irradiated; rat-curative method.								3,300			215
Egg white, hen's	From 2 White Leghorn hens; basal ration + 400 mcg. riboflavin per 100 gm. of ration; U. S. A.; microbiological method:											
	First hen									386–700		66
	Second hen									409–530		
	From White Leghorn hens, basal ration only, containing 160 mcg. riboflavin per 100 gm. of ration; U. S. A.; microbiological method:											
	December 1938										275	66
	February 1939										149	

---

[7] Values calculated from authors' data.

Vitamin values per 100 grams of edible portions of foods—Continued

Item (1)	Description of sample (2)	Vitamin A value (3a)	(3b)	Thiamin (vitamin B₁) (4a)	(4b)	Ascorbic acid (vitamin C) (5a)	(5b)	Vitamin D (6a)	(6b)	Riboflavin (7a)	(7b)	References (8)
		I. U.	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
Egg white, hen's—Continued.	From White Leghorn hens, basal ration containing 160 mcg. riboflavin per 100 gm. for varying periods, supplemented later with riboflavin; U. S. A.; microbiological method:											
	First hen, basal ration										64–65	66
	First hen, basal ration+25 mcg. riboflavin daily										166–217	
	First hen, basal ration+50 mcg. riboflavin daily										135–161	
	Second hen, basal ration										137–152	
	Second hen, basal ration + 50 mcg. riboflavin daily.										346–220	
	[England]; thiochrome method			0								207
	India; fluorometric method									496		195
	Sweden; fluorometric method									400–500		67
	U. S. A.; rat-growth method			Nil								28
	U. S. A.; microbiological method									310		242
Egg yolk, hen's	From Jersey Black Giants mated with White Leghorns; on limited range; ration supplemented with plant protein; February–June; U. S. A.; rat-curative method.							140–390				56
	From Jersey Black Giants mated with White Leghorns; no direct sunlight; U. S. A.; rat-curative method:											
	Supplemented with 1.4 I. U. vitamin D from cod-liver oil per gm. of feed.							30–80				56
	Supplemented with 2.8 I. U. vitamin D from cod-liver oil per gm. of feed.							70–120				
	Supplemented with 5.6 I. U. vitamin D from cod-liver oil per gm. of feed.							120–160				
	Supplemented with 3.6 I. U. vitamin D from viosterol per gm. of feed.							50–130				
	Supplemented with 7.2 I. U. vitamin D from viosterol per gm. of feed.							100–140				
	Supplemented with 14.4 I. U. vitamin D from viosterol per gm. of feed.							400–600				
	From White Leghorns on basal diet supplemented with varying amounts of vitamin D; Ohio; rat-curative method:											

	Supplemented with 54 I. U. vitamin D from irradiated ergosterol per gm. of feed.							2,750				23
	Supplemented with 5.4 I. U. vitamin D from irradiated ergosterol per gm. of feed.							250				
	Supplemented with 54 I. U. vitamin D from cod-liver oil per gm. of feed.							4,250				
	Supplemented with 5.4 I. U. vitamin D from cod-liver oil per gm. of feed.								450			
	Supplemented with 0.54 I. U. vitamin D from cod-liver oil per gm. of feed.								65			
	No supplement								25			
	From White Leghorn pullets on basal ration (mash+yellow corn+wheat); Wisconsin; spectrophotometric method:											
	2 percent cod-liver oil added to ration	3,070										16
	1 percent cod-liver oil added to ration	2,830										
	0.5 percent cod-liver oil added to ration	2,600										
	0.25 percent cod-liver oil added to ration	2,370										
	On basal ration alone	2,200										
	1 percent sardine oil added to ration	1,800										
	From Single Comb White Leghorn pullets; U. S. A.; rat-growth method:											
	Basal diet supplemented with 10 Sherman units vitamin A per gm. of ration.		140									18
	Basal diet supplemented with 2.5 Sherman units vitamin A per gm. of ration.		52									
	Basal diet supplemented with 5 Sherman units vitamin A per gm. of ration.		105									
	England; rat-growth method	3,000										46
	2 samples; England; rat-curative method							150 500				46
	[England]; thiochrome method			480								207
	Boiled; England; bradycardia method				[2] 420							11
	Sweden; fluorometric method									500-600		67
	U. S. A.; rat-growth method			354								28
	U. S. A.; microbiological method									760		242
Eggplant	Black King; garden fresh; Ohio; dye titration					12.1						34
	Fort Myer Market; Washington, D. C., market; June; rat-growth method.	Nil										29
	Average and range; Argentina; dye titration					11 9-13						216
	Java; rat-growth method	24-25										98
	Average and range, 5 samples; Texas; dye titration					2.1 1.5-2.9						85
	U. S. A.; fluorometric method									31		126

---

[2] Values on cooked- or processed-weight basis.

Vitamin values per 100 grams of edible portions of foods—Continued

Item (1)	Description of sample (2)	Vitamin A value (3a)	Vitamin A value (3b)	Thiamin (vitamin B1) (4a)	Thiamin (vitamin B1) (4b)	Ascorbic acid (vitamin C) (5a)	Ascorbic acid (vitamin C) (5b)	Vitamin D (6a)	Vitamin D (6b)	Riboflavin (7a)	Riboflavin (7b)	References (8)
		I. U.	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
Endive	Batavian Full-Heart; New York; dye titration:											
	Freshly harvested					**12**						280
	Held 9 days at 1°–3° C. after harvesting						**10**					
	Bavarian; garden fresh; Ohio; dye titration:											
	Green					13.0						34
	Bleached					5.4						
	Green Curled Pancalier; New York; dye titration:											
	Freshly harvested					**14**						28
	Held for 9 days at 1°–3° C. after harvesting						**9**					
	Held 3 days at room temperature after harvesting.						**4**					
	White curled; freshly harvested; New York; dye titration.					13						280
	Curled, summer; Washington, D. C., market; rat-growth method:											
	Raw	[5] **3,850**										29
	Cooked		[4] **4,880**									
	[England]; thiochrome method			57								209
	Average, 4 varieties; freshly harvested; New York; dye titration.					13						280
	U. S. A.; fluorometric method									61		126
	Bleached; U. S. A.; rat-growth method			99								28
Escarole	Average and range; Argentina; dye titration					7 5–9						216
Fennel	Young leaves; China; dye titration					11.20						41
	China; dye titration					50.6						41
Fenugreek	Leaves; India; dye titration:											
	Fresh					**140.7**						212
	After 24 hours at room temperature						**98.9**					
	After 5 days at room temperature						**13.4**					
Fig	Adam; freshly picked; western Australia; dye titration.					2						123
	Adam; (Cross); freshly picked; western Australia; dye titration.					2						123
	Brown Turkey; freshly picked; western Australia; dye titration.					2						123
	Chinese (Kesemek); Java; dye titration					3.9						244
	Chinese; China; dye titration					8.7						41
	Smyrna; freshly picked; western Australia; dye titration.					3						123

	Average and range, 7 samples; Texas; dye titration					1.8 0.7–3.5						85
	Thiochrome method			57								209
	Green; India; fluorometric method									52		291
Dried	Lob Ingir; unsulfured; California; rat-growth method.	115										29
	Bradycardia method			300								11
Preserved	India; dye titration					Nil						211
Filbert (see Hazelnut).												
Fish (see Mackerel, Salmon, etc.).												
Flatfish	Back muscle, 78.6 percent moisture; Japan; lumiflavin method.									20.2		248
Flour (see Rye, Wheat, etc.).												
Garlic	Average and range; Argentina; dye titration					32 20–48						216
	India; dye titration:											
	Raw					7.03						25
	Cooked						[3] 3.22					
	Stored: India; dye titration						5.2					1
	India; dye titration					13.2						211
	Market sample; [U. S. A.]; dye titration					13.9						34
Gingerroot	India; dye titration					6.0						1
Gizzard:												
Chicken	China; dye titration					6.1						41
	From Single Comb White Leghorn; average and range, 5 samples; New York; fluorometric method:											
	Diet contained 1 mcg. riboflavin per gm									130 90–150		125
	Diet contained 6.9 mcg. riboflavin per gm									410 390–440		
Duck	China; dye titration					16.0						41
Dried	do					19.3						41
Goat meat	Muscle; India; dye titration.					6.6						225
Various organs (see Heart, Liver, Kidney, etc).												
Goose	China; dye titration					12.90						41
Various organs (see Liver).												

---

[3] Values on cooked- or processed-weight basis.
[4] Values on raw-weight basis.
[5] This figure may be significantly affected by method of sampling because of oxidative enzymes.

amin values per 100 grams of edible portions of foods—Continued

Item	Description of sample	Vitamin A value		Thiamin (vitamin B_1)		Ascorbic acid (vitamin C)		Vitamin D		Riboflavin		References
(1)	(2)	(3a)	(3b)	(4a)	(4b)	(5a)	(5b)	(6a)	(6b)	(7a)	(7b)	(8)
		I. U.	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
Gooseberry	Cape Gooseberry; western Australia; dye titration					21						123
	do					22						123
	Careless; England; dye titration:											
	Green, hard, small					*83*						201
	Green, hard, medium					*79*						
	Green, hard, large					*78*						
	Green, slightly soft, mixed sizes					*38*						
	Yellowish-green, soft, mixed sizes					*43*						
	Yellow, ripe, mixed sizes					52						
	Poorman; freshly picked; Ohio; dye titration					16. 5						34
	Whinham; England; dye titration:											
	Green, hard, small, mid-June					*42*						201
	Green, hard, medium, mid-June					*43*						
	Green, hard, large, mid-June					*39*						
	Green, hard, small, 1 week later					*48*						
	Green, hard, medium, 1 week later					*36*						
	Green, hard, large, 1 week later					*35*						
	Green, hard, medium, 2 weeks later					*35*						
	Green, hard, large, 2 weeks later					*21*						
	Green, hard, very large, 2 weeks later					*23*						
	Green, hard, small, 3 weeks later					*43*						
	Green, hard, medium, 3 weeks later					*22*						
	Green, hard, large, 3 weeks later					*22*						
	Streaked red, soft, small, early July					27						
	Streaked red, soft, medium, early July					38						
	Streaked red, soft, very large, early July					35						
	Streaked red, soft, medium, 1 week later					41						
	Streaked red, soft, large, 1 week later					37						
	Streaked red, soft, very large, 1 week later					37						
	Streaked red, soft, small, 2 weeks later					40						
	Streaked red, soft, medium, 2 weeks later					29						
	Streaked red, soft, large, 2 weeks later					27						
	Red, ripe, medium, mid-July					39						
	Red, ripe, large, mid-July					36						
	Red, ripe, very large, mid-July					30						
	Red, ripe, medium, 2 weeks later					15						
	Red, ripe, large, 2 weeks later					21						
	Red, very ripe, small, mid-July					39						
	Red, very ripe, medium, mid-July					27						
	Red, very ripe, large, mid-July					31						
	Red, very ripe, medium, 1 week later					31						
	Red, very ripe, large, 1 week later					26						

Green; average, 2 varieties; Germany; dye titration:											
Unripe					*11.3*						229
Ripe					32.8						
Ripe, stored 14 days at 2° C						15.5					
Green: Maryland; rat-growth method	380										29
Red; average, 2 varieties; Germany; dye titration:											
Unripe					*7.8*						229
Ripe					26.2						
Ripe, stored 3 days at 2° C						21.4					
White; average, 2 varieties; Germany; dye titration:											
Unripe					*10.7*						229
Ripe					23.8						
Ripe, stored 3 days at 2° C						10.5					
Red, white, and green varieties; unripe; average and range, 8 varieties; Germany; dye titration.					*10.4* *7.5–13.8*						229
Average and range, 6 batches; England; dye titration.					36.6 27.6–47.0						200
Range, 4 batches; England; dye titration:											
Fresh					27.6–47.0						200
After cooking in sirup, liquid included						17.8–28.5					
Commercially canned in sirup; liquid included; England; dye titration:											
Raw					67.5						200
3 days after canning						[4] 31.6					
After 14-week storage at room temperature						[4] 24.2					
After 31-week storage at room temperature						[4] 28.5					
Bottled in water; England; dye titration:											
Raw					75.8						200
After 3-day storage at room temperature						[4] 23.2					
After 14-week storage at room temperature						[4] 22.4					
After 31-week storage at room temperature						[4] 19.5					
England; dye titration:											
Fresh					40						202
Jam made from above						[2] 11					
India; dye titration:											
Fresh					680						96
Preserved in brine, stored 37 days						[2] 280					
Preserved in brine, stored 57 days						[2] 320					
Preserved by boiling in water and frying in oil with addition of chili powder and salt.						[2] 96					

---

[2] Values on cooked- or processed-weight basis.
[4] Values on raw-weight basis.

Vitamin values per 100 grams of edible portions of foods—Continued

Item (1)	Description of sample (2)	Vitamin A value (3a)	Vitamin A value (3b)	Thiamin (vitamin B_1) (4a)	Thiamin (vitamin B_1) (4b)	Ascorbic acid (vitamin C) (5a)	Ascorbic acid (vitamin C) (5b)	Vitamin D (6a)	Vitamin D (6b)	Riboflavin (7a)	Riboflavin (7b)	References (8)
		I. U.	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
Gooseberry—Con.	India; dye titration:											
	Fresh pulp					473						96
	do					[8] 2,428						
	Dried in shade at room temperature						[2] 1,780					
	Dried in sun						[2] 1,550					
	Fresh pulp					611						
	do					[8] 3,090						
	Dried in shade at room temperature						[2] 2,280					
	Dried in sun						[2] 1,840					
	Fresh pulp					680						
	do					[9] 3,470						
	Dried in shade at room temperature						[2] 2,660					
	India; dye titration					425						245
	Country (Blimbing); Java; dye titration					14.8						244
	India; (Malaka); Java; dye titration:											
	Fresh					541.9						244
	Pickled, another sample						[2] 294.5					
Canned	Commercially canned; average and range; England; dye titration.					24 13–31						202
Dried	Dried in sun; dye titration:											
	Immediately after drying					1,380						96
	Stored 42 days at 0° C						1,350					
	Stored 103 days at 0° C						1,386					
	Stored 42 days at 20°–25° C						1,050					
	Stored 103 days at 20°–25° C						950					
	Stored 42 days at 37° C						762					
	Stored 103 days at 37° C						357					
Juice	England; commercial, pasteurized					[3] 30						39
	India; dye titration:											
	From fresh berries					880 940						96
	From berries stored 23 days					880						
	India; dye titration:											
	Fresh					940						96
	Stored 26 days						850					
Various parts	Whinham; England; dye titration:											
	Green turning red:											
	Inner tissue, pulp, and seeds					19						201
	Outer tissue					24						

	Dark red, ripe:											201
	Inner tissue, pulp, and seeds					14						
	Outer tissue					34						
	Dark red, very ripe:											
	Inner tissue, pulp, and seeds					19						
	Outer tissue					43						
Gourd	Bitter; China; dye titration					56.46						41
	Bitter; India; dye titration					88.4						211
	Bitter; India; dye titration:											
	Green					*106.7*						212
	After 24 hours at room temperature, still green						*87.6*					
	After 4 days at room temperature, quite ripe						23.3					
	Loofah; China; dye titration					5.3						41
	Snake gourd; India; fluorometric method									115		195
	Snake gourd; India; dye titration					Nil						211
	White; China; dye titration					19.74						41
Various parts	India; dye titration:											
	Flesh					14.1						225
	Skin					67.1						
Grape	Black Prince; freshly picked; western Australia; dye titration.					5						123
	Crystal; freshly picked; western Australia; dye titration.					2						123
	Muscadine; pulp; average and range; Texas; dye titration.					3.7 1.9–5.5						85
	Muscat of Alexandria; freshly picked; western Australia; dye titration.					5						123
	Muscat Canon Hall; partly ripe, freshly picked; western Australia; dye titration.					*4*						123
	Muscat-Gordo Blanco; freshly picked; western Australia; dye titration.					4						123
	Sauvignon and Cabernet; France; thiochrome and lumiflavin methods, respectively:											
	Green			*50–80*						5		84
	Ripe			20–40						5		
	Fermented juice				[3] 5–10						[3] 30–50	
	Scuppernong; Texas; dye titration					7.2						85
	Small Pink; Texas; dye titration					2.3						85
	Sultana; thiochrome method			87								209
	Sultana; freshly picked; western Australia; dye titration.					6						123
	Thompson Seedless; California	50										189
	Thompson Seedless; market sample; U. S. A.; dye titration.					5.5						34
	Tokay; Washington, D. C., market; California; rat-growth method.	<100										29
	Xante Currant; freshly picked; western Australia; dye titration.					3						123

[2] Values on cooked or processed-weight basis.
[3] Values per 100 ml.
[8] Values on dry-weight basis.

Vitamin values per 100 grams of edible portions of foods—Continued

Item	Description of sample	Vitamin A value		Thiamin (vitamin B_1)		Ascorbic acid (vitamin C)		Vitamin D		Riboflavin		References
(1)	(2)	(3a)	(3b)	(4a)	(4b)	(5a)	(5b)	(6a)	(6b)	(7a)	(7b)	(8)
		I. U.	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
Grape—Continued.	Average and range, 75 varieties; Germany; dye titration.					2.6 1.0–10.7						229
	Germany; dye titration:											
	Blue					3.3						279
	Yellow					0.7						
	Green pulp; England; bradycardia method			*Trace*								11
	Green; average and range; Texas; dye titration					1.9 1.2–2.6						85
	Green; thiochrome method			33								209
	Red; U. S. A.; fluorometric method									32		126
	White; U. S. A.; fluorometric method									92		126
	[England]; thiochrome method			33								210
	India; dye titration					<1.0						1
	India; fluorometric method									24		291
	Rumania; dye titration					5.5						204
Juice	Alicante; 1936; California; rat-growth method:											
	Frozen, stored 1 month				[3] 33							190
	Pasteurized, stored 1 month				[3] 40							
	Pasteurized, stored 5 months				[3] 18							
	Made into wine immediately, sulfited, stored 1 month.				[3] 9							
	Made into wine, unsulfited, stored 1 month				[3] 12							
	Alicante; pasteurized, stored 7 months; California; rat-growth method.										[3] 23	190
	Muscat; California; rat-growth method:											
	1935 crop:											
	Fresh			[3] 30–57								190
	6 months later				[3] 6–21							
	Made immediately into Muscatel wine, stored 12 months.				[3] 12							
	1937 crop; pasteurized:											
	Stored 2 months				[3] 32							
	Made into wine, stored 3 months				[3] 11							
	Made into wine, stored 4 months				[3] 10							
	Made into wine, sulfited, stored 3 months				[3] 8							
	Made into wine, sulfited, stored 4 months				[3] 10							
	Made into wine, fined over bentonite, stored 3 months.				[3] 5							
	Made into wine, stored 4 months				[3] 3							
	Muscat; pasteurized; California; rat-growth method:											

	Fresh									[3] 150		190
	Stored 4 months										[3] 78	
	Palomino; 1935 vintage; California; rat-growth method:											
	Fresh			[3] 12								190
	After 6 months storage				[3] 6–18							
	Made immediately into wine, stored 12 months				[3] 9							
	Made into wine, detartared, stored 12 months				[3] 9							
	Tokay; 1935 crop; California; rat-growth method:											
	Fresh			[3] 30								190
	Stored 6 months				**Trace**							
	Made immediately into Angelica wine, stored 12 months.				[3] 12							
	Zinfandel; 1935 crop; California; rat-growth method:											
	Fresh			[3] 30–42								190
	After 6 months storage				[3] 12–21							
	Made immediately into wine, stored 12 months				0							
	Made into wine, detartared, stored 12 months				0							
	Argentina; dye titration:											
	White					[3] 5						216
	Dark					[3] 7						
	From very ripe and old fruit; India; dye titration					2.5						211
	U. S. A.; dye titration					0						43
Wine	Alicante; 1936 vintage; stored 1 month; California; rat-growth method:											
	Sulfited				[3] 9							190
	Unsulfited				[3] 12							
	Alicante; California; rat-growth method:											
	Unsulfited:											
	Stored 3 months										[3] 80	190
	Stored 7 months										[3] 81	
	Sulfited:											
	Stored 3 months										[3] 80	
	Stored 7 months										[3] 90	
	Angelica; from Tokay grapes, 1935 vintage, stored 12 months; California; rat-growth method.				[3] 12							190
	Angelica; from Tokay grapes; California; rat-growth method:											
	Stored 15 months										[3] 100	190
	Stored 19 months										[3] 81	
	Muscatel; 1935 vintage, stored 12 months; California; rat-growth method.				[3] 12							190
	Muscatel; California; rat-growth method:											
	Sulfited:											
	Fresh									[3] 105–106		190
	Stored 4 months										[3] 105–106	
	Unsulfited:											
	Fresh									[3] 140–150		
	Stored 4 months										[3] 140–150	
	Fined over bentonite:											
	Fresh									[3] 70–86		
	Stored 4 months										[3] 70–86	

[3] Values per 100 ml.

Vitamin values per 100 grams of edible portions of foods—Continued

Item	Description of sample	Vitamin A value		Thiamin (vitamin B₁)		Ascorbic acid (vitamin C)		Vitamin D		Riboflavin		References
(1)	(2)	(3a)	(3b)	(4a)	(4b)	(5a)	(5b)	(6a)	(6b)	(7a)	(7b)	(8)
		I. U.	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
Grape—Continued. Wine—Continued.	Palomino; 1935 vintage, stored 12 months; California; rat-growth method.				[3] 9							190
	Palomino; California; rat-growth method:											
	Stored 15 months										[3] 45	190
	Stored 19 months										[3] 81	
	Zinfandel; 1935 vintage, stored 12 months; California; rat-growth method.				0							190
	Zinfandel; stored 15 months; California; rat-growth method.										[3] 27	190
Grapefruit (see Citrus fruit).												
Grass	Lawn grass; U. S. A.; dye titration					73						22
	Orchard grass; fresh green plants, 6–15 inches high; U. S. A.; colorimetric method.	[1] 6,300–11,300										7
	Green, tender and fresh; India; dye titration					75.3						211
	Fresh; Sweden; fluorometric method									50		67
Dried	Dried in vacuum; Sweden; fluorometric method									600		67
	U. S. A.; microbiological method									2,370		242
	Range, 6 samples; Wisconsin:											
	Rat-growth method									1,600–2,500		272
	Microbiological method									710–2,440		
Grouse	Roasted; [Scotland]; thiochrome method				[2] 432							209
Guava	Country variety; ripe; India; dye titration					299.0						211
	Hill variety; ripe and fresh; India; dye titration					11.0						211
	Hill variety; tender and fresh; India; dye titration					19.1						211
	Large Yellow; western Australia; dye titration					110						123
	India; fluorometric method									33		291
	Pulp, India; dye titration					90.0						1
Various parts	India; dye titration:											
	Flesh					102						225
	Skin					185.4						
Haddock	Fresh fillets; Washington, D. C., market sample shipped from Boston; rat-growth method.	Nil										29
	Fresh; thiochrome method			9								209
	Smoked; thiochrome method				Nil							209
Halibut	U. S. A.; rat-growth method			84								28
	Thiochrome method			114								209
	Fried; bradycardia method				[2] 180							11

Ham (See pork).												
Haw	[England]; thiochrome method:											
	Green			126								210
	Red			57								
Hazelnut	[China]; dye titration					2.74						41
	[England]; bradycardia method			600								11
	Cob nut; [England]; thiochrome method			228								210
Heart:												
Beef	U. S. A.; rat-growth and microbiological methods, respectively:											
	Fresh			[7] 675						760		182, 183
	Stewed				[4,7] 292						[4,7] 780 [4,7] 717	
	Cooked; Washington, D. C., market sample; rat-growth method.		[4] ca 200									29
Chicken	From Single Comb White Leghorns; New York; fluorometric method:											
	Ration contained 1 mcg. riboflavin per gm									430		125
	Ration contained 6.9 mcg. riboflavin per gm.; average and range.									1,840 1,670–2,040		
	U. S. A.; dye titration					8						22
Duck	China; dye titration					24.3						41
Goat	India; dye titration					7.7						225
Pork	U. S. A.; rat-growth and microbiological methods, respectively.			[7] 592						1,120		182; 183
	U. S. A.; dye titration					4						22
Herring	Average from several districts of Norway; rat-growth and rat-curative methods, respectively:											
	1933:											
	Raw	[7] 68						[7] 1,220				162
	Smoked		[2,7] 84									
	1936:											
	Raw	[7] 36						[7] 1,840				
	Smoked								[2,7] 1,910			
	Canned								[2] 1,713			
	Average for 1937, from several districts of Norway; rat-growth method.	[7] 240										162
	Green, fresh; Germany; chromatographic and colorimetric method.									104.4		233
	Red, fresh; Germany; chromatographic and colorimetric method.									260.5		233
	Back muscle, 76.6 percent moisture; Japan; lumiflavin method.									54		248

---

[1] International Unit values were calculated from carotene analyses or included carotene analyses.
[2] Values on cooked- or processed-weight basis.
[3] Values per 100 ml.
[4] Values on raw-weight basis.
[7] Values calculated from authors' data.

Vitamin values per 100 grams of edible portions of foods—Continued

Item	Description of sample	Vitamin A value		Thiamin (vitamin B₁)		Ascorbic acid (vitamin C)		Vitamin D		Riboflavin		References
(1)	(2)	(3a)	(3b)	(4a)	(4b)	(5a)	(5b)	(6a)	(6b)	(7a)	(7b)	(8)
		I. U.	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
Herring—Continued	Small, 1 sample; [Norway]:											
	Lumiflavin method									78		163
	Oxidation method									400		
	Rat-growth method									350		
	Thiochrome method			6								209
	Fried; bradycardia method				0							13
	Kippers; [England]; thiochrome method			Nil								209
	Kippers; 1 sample; [Norway]:											
	Lumiflavian method									60–100		163
	Oxidation method									310		
	Rat-growth method									200		
Canned	Stored 8 years in aluminum can; Norway; rat-curative method.							1,400				162
Hip, rose	Rosa rugosa; Denmark; dye titration:											
	Fresh					820						138
	Canned						[4] 860					
	Canned, stored 3 months at 15° C						[4] 590					
	Canned, stored 6 months at 15° C						[4] 590					
	Canned, stored 2 years at 15° C						[4] 460					
	Canned, stored 3 years at 15° C						[4] 430					
	Denmark; dye titration:											
	Fresh					880						138
	Canned, stored 3 months at 15° C						[4] 490					
	Canned, stored 3 years at 15° C						[4] 300					
	Fresh					910						
	Canned, stored 1 year at 15° C						[4] 480					
Hominy	Made from white corn, germ and hull mechanically removed; commercial sample; rat-growth method.			Nil								(6)
Honey	Sweet clover, unstrained; Michigan; rat-growth method.	0										29
	Germany; dye titration:											
	Dark, range of 7 samples					1.1–9.7						279
	Light, range of 11 samples					2.4–7.6						
	Light brown, 1 sample					14.6						
	Thiochrome method			18								209
Horseradish	Garden fresh Ohio; dye titration					122.4						34

Jack-fruit	Ripe; India; fluorometric method									34		291
	India; dye titration					1.0						38
Jam:												
Apricot	[England]; thiochrome method			Nil								209
Currant, black	do			Nil								209
Greengage	do			81								209
Plum	do			75								209
Raspberry	do			Nil								209
Strawberry	do			Nil								209
Jelly:												
Lemon	Commercial sample; dye titration					<1.						9
Orange	do					<1.						9
Jujube	Dried, small; China; dye titration					13.3						41
Kale	Bloomsdale Double Curled; New York; dye titration.					147						280
	Bloomsdale Double Curled; New York; dye titration:											
	Freshly harvested					150						280
	After storage 2 weeks at 1°-3° C						116					
	After holding 4 days at room temperature						74					
	Blue Scotch; Washington, D. C., market in March and April; Florida; rat-growth method:											
	Raw	[5] 10,500										29
	Cooked		[4] 14,490									
	Dwarf German; dye titration					117						146
	Dwarf German; 5 samples; New York; dye titration.					112						280
	Dwarf German; New York; dye titration:											
	Freshly harvested					126						280
	After storage for 2 weeks at 1°-3° C						107					
	After holding 4 days at room temperature						48					
	Scotch; market sample; U. S. A.; dye titration:											
	Autumn sample					187.7						34
	Winter sample					101.1						
	Europe; spectroscopic method:											
	Raw	[1] 9,870										290
	Cooked 20 minutes		[1] [4] 8,750									
	Steamed		[1] [4] 8,320									
	U. S. A.; rat-growth method			189								28

---

[1] International Unit values were calculated from carotene analyses or included carotene analyses.
[4] Values on raw-weight basis.
[5] This figure may be significantly affected by method of sampling because of oxidative enzymes.
[6] Unpublished data, Bureau of Home Economics.

Vitamin values per 100 grams of edible portions of foods—Continued

Item	Description of sample	Vitamin A value		Thiamin (vitamin B₁)		Ascorbic acid (vitamin C)		Vitamin D		Riboflavin		References
(1)	(2)	(3a)	(3b)	(4a)	(4b)	(5a)	(5b)	(6a)	(6b)	(7a)	(7b)	(8)
		I. U.	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
Kidney:												
Beef	Fresh; Sweden; fluorometric method									800–1,600		67
	U. S. A.; rat-growth and microbiological methods, respectively:											
	Fresh			[7] **316**						**2,110**		182; 183
	Stewed				[4] [7] **190**						[4] [7] **1,770**	
	U. S. A.; microbiological method:											
	Fresh									**1,870**		183
	Stewed										[4] [7] **1,793**	
	Fresh									**2,280**		
	Stewed										[4] **1,899**	
	[England]; thiochrome method			171								209
Goat	India; dye titration					17.6						225
Pork	[England]; bradycardia method			1,020								11
	U. S. A.; rat-growth and microbiological methods, respectively.			519						2,000		182; 183
	U. S. A.; microbiological method									1,970		183
Sheep	[England]; thiochrome method			228								209
	[England]; bradycardia method			570								11
Kipper (see Herring).												
Kohlrabi	Wiezer Prager Treib; Germany; dye titration:											
	Fresh, 92.5 percent moisture in sample					**61.2**						229
	After 48 hours at 7° C.; 89.7 percent moisture in sample.						**50.4**					
	After 96 hours at 7° C., 88.9 percent moisture in sample.						**40.3**					
	Fresh, 92.3 percent moisture in sample					**60.8**						
	After 48 hours at 7° C., 89.9 percent moisture in sample.						**48.6**					
	After 96 hours at 7° C., 87.0 percent moisture in sample.						**35.7**					
	China; dye titration					64.7						41
	Germany; dye titration					34						279
	do					34						69
	Germany; dye titration:											
	Raw					**37.6**						161
	Cooked in water, liquid included						[4] **26.7**					
	Cooked in water, liquid discarded						[4] **8.9**					
	Steamed						[4] **35.8**					
	Pickled						**0**					
	Canned						**0**					
	Average, 6 samples; New York; dye titration					65						280

Canned	Germany; dye titration					0						161
Various parts	India; dye titration:											
	Flesh					97						225
	Leaves					326.4						
	Skin					155.2						
Kolanut	China; dye titration					0						41
Kumquat (see Citrus fruit).												
Lamb	Loin chop, lean portion; U. S. A.; rat-growth method.			258								28
	do			237								28
	do	Nil										29
	Leg of lamb; U. S. A.; rat-growth method			[7] 436								182
	Leg of lamb; U. S. A.; rat-growth and microbiological methods, respectively.			[7] 436						360		182;183
	Leg of lamb; U. S. A.; microbiological method									280		183
	Lean, roasted; bradycardia method				[2] 150							11
Various organs (see Liver).												
Leek	Leaves; Germany; dye titration:											
	Fresh					**15.4**						59
	Dried						[2] **88.3**					
	do						[4] **13.1**					209
	[England]; thiochrome method			153								211
	India; dye titration					10.7						34
	Market sample; bleached; U. S. A.; dye titration					18.0						
Lemon (see Citrus fruit).												
Lentil	Mature seeds; cooked; Washington, D. C., market sample; rat-growth method.		[4] <100									28
	Dried, packaged sample; U. S. A.; rat-growth method.			435								(6)
	[England]; bradycardia method			630								11
	[England]; thiochrome method			510								209
	India; dye titration:											
	Dry seeds					**3.0**						1
	Sprouted seeds						**15.0**					
Lettuce:												
Butterhead	Salamander; freshly harvested, average, 5 samples; New York; dye titration.					14						280
	Tennis Ball; garden fresh; Ohio; dye titration					55.3						34
	White Boston; freshly harvested; average, 7 samples; New York; dye titration.					13						280
Cos or Romaine	New York; dye titration:											
	Freshly harvested; average, 6 samples					**19**						280
	Freshly harvested; average, 2 samples					**15**						
	After storing 10 days at 1°-3° C.; average, 2 samples.						**10**					
	Freshly harvested; average, 2 samples					**14**						
	After holding 3 days at room temperature; average, 2 samples.						**8**					
	U. S. A.; fluorometric method									96		126

---

[2] Values on cooked- or processed-weight basis.
[4] Values on raw-weight basis.
[6] Unpublished data, Bureau of Home Economics.
[7] Values calculated from authors' data.

Vitamin values per 100 grams of edible portions of foods—Continued

Item	Description of sample	Vitamin A value		Thiamin (vitamin B$_1$)		Ascorbic acid (vitamin C)		Vitamin D		Riboflavin		References
(1)	(2)	(3a)	(3b)	(4a)	(4b)	(5a)	(5b)	(6a)	(6b)	(7a)	(7b)	(8)
Lettuce—Con.												
Crisphead	California iceberg; New York; dye titration:	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I.U.*	*I. U.*	*Mcg.*	*Mcg.*	
	Freshly harvested; average, 6 samples					10						280
	Freshly harvested; average, 2 samples					**12**						
	After storage 10 days at 1°-3° C.; average, 2 samples.						**4**					
	Freshly harvested					**9**						
	After holding 3 days at room temperature						**6**					
	California variety; market sample; U. S. A.; dye titration.					13.3						34
	Iceberg; mixed sample from Arizona and Florida; rat-growth method:											
	Fresh	**[5] 210**										29
	Cooked		**[4] 300**									
	Iceberg; New York; dye titration					10.2						146
	Mignonette; New York; dye titration					10.9						146
	Mignonette; freshly harvested; average, 4 samples; New York; dye titration.					11						280
	Mignonette; garden fresh; Ohio; dye titration					20.5						34
Leaf	Black-Seeded Simpson; freshly harvested; average, 4 samples; New York; dye titration.					21						280
	Hothouse variety; Ohio; dye titration					15.2						34
	Yellow Australian; Germany; modified dye titration.					32						32
	2 determinations on same sample; Michigan; colorimetric method.	**[1] 7,170** **[1] 7,670**										20
	(Stemmy); U. S. A.; fluorometric method									96		126
	U. S. A.; fluorometric method									71		126
Miscellaneous	Head; Boston market sample; spectrographic method.	[1] 230-700										82
	Head; Rumania; dye titration					14.0						204
	Head; U. S. A.; dye titration					5						22
	Head; U. S. A.; rat-growth method			87								28
	Head; U. S. A.; fluorometric method									48		126
	Average and range; Argentina; dye titration					10 6-16						216
	Average and range; England; dye titration					24 5-30						202
	[England]; thiochrome method			69								209
	[England]; bradycardia method			270								11
	Fiji; dye titration					4.3						26
	Fresh; India; dye titration					14.9						211
	India; dye titration					<0.5						1
	India; fluorometric method									116		291

Various parts	Express; Germany; dye titration:											229
	Green outer leaves:											
	Fresh, 91.1 percent moisture in sample	--------	--------	--------	--------	6.6	--------	--------	--------	--------	--------	
	After 48 hours at 7° C., 87.9 percent moisture in sample.	--------	--------	--------	--------	--------	4.3	--------	--------	--------	--------	
	After 96 hours at 7° C., 83.6 percent moisture in sample.	--------	--------	--------	--------	--------	4.4	--------	--------	--------	--------	
	Yellow inner leaves:											
	Fresh, 91.1 percent moisture in sample	--------	--------	--------	--------	3.1	--------	--------	--------	--------	--------	
	After 48 hours at 7° C., 87.9 percent moisture in sample.	--------	--------	--------	--------	--------	3.2	--------	--------	--------	--------	
	After 96 hours at 7° C., 83.6 percent moisture in sample.	--------	--------	--------	--------	--------	3.4	--------	--------	--------	--------	
	Green outer leaves:											
	Fresh, 91.0 percent moisture in sample	--------	--------	--------	--------	10.9	--------	--------	--------	--------	--------	
	After 48 hours at 7° C., 88.6 percent moisture in sample.	--------	--------	--------	--------	--------	4.4	--------	--------	--------	--------	
	After 96 hours at 7° C., 83.6 percent moisture in sample.	--------	--------	--------	--------	--------	2.6	--------	--------	--------	--------	
	Yellow inner leaves:											
	Fresh, 91.0 percent moisture in sample	--------	--------	--------	--------	1.8	--------	--------	--------	--------	--------	
	After 48 hours at 7° C., 88.6 percent moisture in sample.	--------	--------	--------	--------	--------	1.9	--------	--------	--------	--------	
	After 96 hours at 7° C., 83.6 percent moisture in sample.	--------	--------	--------	--------	--------	2.5	--------	--------	--------	--------	
	Maxdorfer Stamm; Germany; dye titration:											
	Green outer leaves:											
	Fresh, 92.3 percent moisture in sample	--------	--------	--------	--------	8.8	--------	--------	--------	--------	--------	
	After 48 hours at 7° C., 88.9 percent moisture in sample.	--------	--------	--------	--------	--------	3.5	--------	--------	--------	--------	
	After 96 hours at 7° C., 84.5 percent moisture in sample.	--------	--------	--------	--------	--------	3.5	--------	--------	--------	--------	
	Yellow inner leaves:											
	Fresh, 92.3 percent moisture in sample	--------	--------	--------	--------	4.4	--------	--------	--------	--------	--------	
	After 48 hours at 7° C., 88.9 percent moisture in sample.	--------	--------	--------	--------	--------	1.7	--------	--------	--------	--------	
	After 96 hours at 7° C., 84.5 percent moisture in sample.	--------	--------	--------	--------	--------	1.7	--------	--------	--------	--------	
	Green outer leaves:											
	Fresh, 94.1 percent moisture in sample	--------	--------	--------	--------	9.6	--------	--------	--------	--------	--------	
	After 48 hours at 7° C., 90.2 percent moisture in sample.	--------	--------	--------	--------	--------	10.5	--------	--------	--------	--------	
	After 96 hours at 7° C., 84.1 percent moisture in sample.	--------	--------	--------	--------	--------	4.4	--------	--------	--------	--------	
	Yellow inner leaves:											
	Fresh, 94.1 percent moisture in sample	--------	--------	--------	--------	3.9	--------	--------	--------	--------	--------	
	After 48 hours at 7° C., 90.2 percent moisture in sample.	--------	--------	--------	--------	--------	3.9	--------	--------	--------	--------	
	After 96 hours at 7° C., 84.1 percent moisture in sample.	--------	--------	--------	--------	--------	4.3	--------	--------	--------	--------	

---

[1] International Unit values were calculated from carotene analyses or included carotene analyses.
[4] Values on raw-weight basis.
[5] This figure may be significantly affected by method of sampling because of oxidative enzymes.

Vitamin values per 100 grams of edible portions of foods—Continued

Item	Description of sample	Vitamin A value		Thiamin (vitamin B₁)		Ascorbic acid (vitamin C)		Vitamin D		Riboflavin		References
(1)	(2)	(3a)	(3b)	(4a)	(4b)	(5a)	(5b)	(6a)	(6b)	(7a)	(7b)	(8)
Lettuce—Con.												
Various parts—Con.	France; thiochrome and lumiflavin methods, respectively:	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
	Inner leaves			20-30						60-80		83
	Outer leaves			20-30						30-80		
	Germany; dye titration:											
	Head				2.1-4.1							279
	Green leaves of head				8.8							
	Inner leaves of head				3.0							
	Head; Germany; dye titration:											
	Green outer leaves				7.5							
	Inner leaves				2.6							
Wild	Fresh; [Ohio]; dye titration				63.6							35
Lime (see Citrus fruit).												
Limequat (see Citrus fruit).												
Litchi	India; dye titration:											
	Fresh					**48.0**						1
	Stored 35 days at 0°						**44.0**					
	India; dye titration					25.0						1
Liver:												
Auk	Guillemot; Greenland; dye titration					22						134
Beef	Average and range, 3 samples; October-November; Boston market sample; rat-growth method.	30,200 12,700-41,800										129
	Boston market sample; rat-growth method:											
	Raw	**41,800**										129
	Pan-fried 10 minutes, no added fat		[2] **59,500**									
	Europe; fluorometric method									1,700		206
	do									1,800		206
	Fresh; Sweden; fluorometric method									900-1,800		67
	U. S. A.; rat-growth method			267								28
	do			[7] 389								182
	U. S. A.; microbiological method:											
	Raw									[7] **3,402**		183
	Fried										[4, 7] **2,106**	
	Raw									[7] **4,050**		
	Fried										[4, 7] **2,784**	
	U. S. A.; microbiological method									4,400		242
	U. S. A.; rat-growth method:											
	Fall									2,850		242
	Winter									3,450		

	U. S. A.; rat-curative method							47				55
	Cooked; U. S. A.; rat-growth method		[4] ca77,000									29
	Average and range, 4 samples; dye titration					31 27–40						251
	Thiochrome method			183								209
	Spectrographic method	[7] 7,230										94
	do	[7] 21,700										
	Cooked; bradycardia method				[2] 450							11
	Liver meal:											
	Reduction method									**4,200**		163
	Rat-growth method									**4,530**		
	Fluorometric method									**8,500**		250
	Rat-growth method									**6,800**		
	Liver meal; commercial sample microbiological method.									5,000		242
Calf	Two samples; October–November, Boston market sample; rat-growth method.	52,600 159,800										129
	From 11 Holstein calves, 25–32 weeks old that received 240–4,900 I. U. of vitamin D daily for last 23–30 weeks before slaughter; Pennsylvania; bioassay.							17 11–22				101
	Average and range, samples from municipal abattoir; France; dye titration.					40.5 30–50						174
	U. S. A.; rat-growth method:											
	Fall									3,450		227
	Winter									4,350		
	U. S. A.; rat-growth and microbiological methods, respectively.			[7] 151						[7] 2,900		182; 183
	U. S. A.; microbiological method									3,900		183
	Washington, D. C., market sample; rat-curative method.							9.5				55
	Average and range, 7 samples; dye titration					33 19–40						251
	Rat-curative method							Nil				46
	Thiochrome method			198								209
Chicken	From Single Comb White Leghorn; average and range, 10 samples; New York; fluorometric method:											
	On ration containing 1 mcg. of riboflavin per gm.									1,120 980–1,230		125
	On ration containing 6.9 mcg. of riboflavin per gm.									3,290 2,820–4,260		
	China; dye titration					37.7						41
	[England]; spectrographic method	[7] 40,300										94
	Average and range, 5 livers from 12-week-old chickens; Europe; dye titration.					39.5 37.9–43.3						261
	U. S. A.; dye titration					28						22
	Cooked; U. S. A.; rat-growth method		[4] ca24,000									29
	Chicks raised to 3 months on ascorbic acid deficient ration; dye titration.					30.2						133

[2] Values on cooked- or processed-weight basis.

[4] Values on raw-weight basis.

[7] Values calculated from authors' data.

Vitamin values per 100 grams of edible portions of foods—Continued

Item (1)	Description of sample (2)	Vitamin A value (3a)	Vitamin A value (3b)	Thiamin (vitamin B_1) (4a)	Thiamin (vitamin B_1) (4b)	Ascorbic acid (vitamin C) (5a)	Ascorbic acid (vitamin C) (5b)	Vitamin D (6a)	Vitamin D (6b)	Riboflavin (7a)	Riboflavin (7b)	References (8)
		I. U.	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
Liver—Continued.												
Cod	Greenland; dye titration					8						134
	Raw; 1 sample:											
	Oxidation method									**700**		163
	Rat-growth method									**650**		
Duck	Eiderduck; Greenland; dye titration					17						134
	China; dye titration					68.2						41
	[England]; spectrographic method	^{7} 40,700										94
Eel	"*Anguilla aucklandi*"; New Zealand; spectrographic method:											
	From a 0.53-gm. liver	^{7} 16,000										64
	From a 2.09-gm. liver	^{7} 34,700										
	From a 12.5-gm. liver	^{7} 90,300										
	Average and range, 7 values	^{7} 175,800 ^{7} 120,000– 220,000										
	"*Anguilla vulgaris*"; Holland and Scotland; spectrographic method:											
	From a 1.26-kg. eel	^{7} 293,000										64
	From a 1.53-kg. eel	^{7} 546,700										
Goat	India; dye titration:											
	Fresh					**73.4**						226
	Fried rapidly in mustard oil at about 190° C						^{2} **58.2**					
	Stored 48 hours in stoppered bottle at 5° C						**72.2**					
	Stored as above for 8 days						**41.2**					
	India; dye titration					26.3						225
Goose	Paté de foie gras; thiochrome method				^{2} 30							209
Lamb	2 samples; September; Boston market sample; rat-growth method.	67,600 113,100										129
	U. S. A.; rat-growth method:											
	Fall									4,950		227
	Winter									5,400		
	U. S. A.; rat-growth and microbiological methods, respectively.			^{7} 414						2,600		182; 183
	Spectrographic method	^{7} 36,700										94
	do	^{7} 49,000										94
	From 7-8-month-old lamb; Washington, D. C., market sample; rat-curative method.							17				55
Pigeon	England; spectrographic method	^{7} 108,300										94
Pork	Average and range, 4 samples; September-October; Boston market sample; rat-growth method.	27,800 12,600– 36,700										129

	Average and range, samples from municipal abattoir; France; dye titration.					32.8 18.5–41.5						174
	Average and range, 5 samples; Europe; fluorometric method.									1,890 1,750–2,000		206
	Raw; Europe; 1 sample:											
	Oxidation method									**3,500**		163
	Rat-growth method									**3,700**		
	U. S. A.; rat-growth method			1,500								182
	2 samples; U. S. A.; microbiological method									2,540 2,900		183
	U. S. A.; rat-growth method:											
	Fall									2,700		227
	Winter									2,700		
	U. S. A.; rat-curative method							44				55
	U. S. A.; dye titration					19						22
	Average and range, 4 samples; dye titration					12 11–14						251
	Spectrographic method	[7] 26,500										94
	do	[7] 3,300										94
	Dye titration					38						24
Rabbit	Wild rabbit; [England]; spectrographic method	[7] 57,300										94
	[England]; dye titration					40						24
Seal	Fjord; Greenland; dye titration					18						134
Sheep	India; fluorometric method									1,700		195
	Winter sample; U. S. A.; rat-growth method									4,350		227
	Average and range, 6 samples; dye titration					46 40–51						251
	Dye titration					45						24
Turkey	[England]; spectrographic method	[7] 70,000										94
	do	[7] 69,000										94
Loganberry	Fresh; average, 3 batches; England; dye titration					35.8						200
Canned	Thiochrome method			33								209
Juice	Commercial sample, pasteurized; England						[3] 26					39
Loquat	India; dye titration					Trace						211
	Freshly picked; western Australia; dye titration					Nil						123
	Market sample; western Australia; dye titration					Nil						123
Mackerel	Back muscle, 69 percent moisture; Japan; lumiflavin method.									82.1		248
	Norway; rat-bioassay:											
	Flesh, 14.1 percent fat							1,100				6
	Liver, 1.4 percent fat							11,300				
	Shipped from Boston; Washington, D. C., market sample; rat-growth method.	175										29

[2] Values on cooked- or processed-weight basis.
[3] Values per 100 ml.
[7] Values calculated from authors' data.

Vitamin values per 100 grams of edible portions of foods—Continued

Item	Description of sample	Vitamin A value		Thiamin (vitamin B_1)		Ascorbic acid (vitamin C)		Vitamin D		Riboflavin		References
(1)	(2)	(3a)	(3b)	(4a)	(4b)	(5a)	(5b)	(6a)	(6b)	(7a)	(7b)	(8)
		I. U.	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
Mango	Fazli ripe; India; fluorometric method									55		291
	Langra; India; fluorometric method									50		291
	Fiji; dye titration					82.2						26
	Bengal variety; India; fluorometric method									45		291
	Green; India; dye titration					*3.2*						1
	Ripe fruit pulp; India; dye titration					13.0						1
	India; dye titration					15.3						1
	Freshly picked; western Australia; dye titration					13						123
	India; dye titration:											
	Mature, but not fully ripe					*27.5*						212
	After 19 hours at room temperature						*26.7*					
	After 116 hours at room temperature, partly ripe.						*25.8*					
	After 178 hours at room temperature, fully ripe.						11.3					
Various parts	Pulp only; India; dye titration:											
	Mature, but not fully ripe					*20.9*						212
	After 19 hours at room temperature						*17.5*					
	After 116 hours at room temperature, partly ripe.						*10.5*					
	After 178 hours at room temperature, fully ripe						7.1					
	Outer skin only; India; dye titration:											
	Mature, but not fully ripe					*82.1*						212
	After 19 hours at room temperature						*86.2*					
	After 116 hours at room temperature, partly ripe.						*87.8*					
	After 178 hours at room temperature, fully ripe						26.9					
Mangosteen:												
Various parts	India; dye titration:											
	Flesh					3.1						211
	Outer skin					Nil						
Maple sugar	Massachusetts; rat-growth method	0										74
Margarine (see Oleomargarine).												
Marmalade	Orange; England; thiochrome method			Nil								209
	Orange; home-made, medium peel content; England; dye titration.					<1						9

	Orange; commercial samples; dye titration:											9
	Very high peel content					14						
	High peel content; average and range, 4 samples.					8.1 7-11						
	Medium peel content; average and range, 3 samples.					8.0 7.0-8.5						
	Low peel content, 2 samples					6.0 6.5						
Marrow	England; thiochrome method			Nil								209
	[England]; bradycardia method			30-60								13
	India; dye titration					17.8						1
Meat (see Beef, Pork, etc.).												
Milk:												
Buffalo	Fluid; average and range, 4 samples; India; dye titration:											38
	Raw					[3]1.0 [3]0.9-1.1						
	Boiled						[3]0.7 0.7-0.8					
Cow:												
Dry:												
Skim	[England]; thiochrome method			255								209
	India; fluorometric method									1,305		195
	Washington dairy farms; microbiological method									2,940		47
	Open market; Washington; microbiological method.									2,150		47
	Average and range of values on same sample as determined by 5 laboratories; U. S. A.; microbiological method.									1,740 1,450-1,900		143
	Spray process; U. S. A.; modified dye titration: 2 samples					7.88 1.79						293
	Respectively reconstituted to 12.5 percent total solids.						[3]1.15 [3]0.26					
	Roller process; U. S. A.; modified dye titration:											293
	In closed tin container					6.27						
	Reconstituted to 12.5 percent total solids						[3]0.91					
	1 sample; U. S. A.:											272
	Rat-growth method									1,700		
	Microbiological assay									1,700		
	Commercial sample; U. S. A.; rat-growth method			375								28
	do	ca 140										29
	U. S. A.; microbiological method									1,700		242
Whole	Spray-dried sample; England:											122
	Rat-growth method									930		
	Fluorometric method									1,020		
	Roller process; U. S. A.; modified dye titration:											293
	Open barrel container					9.71						
	Reconstituted to 12.5 percent total solids						[3]1.4					

---

[3] Values per 100 ml.

Vitamin values per 100 grams of edible portions of foods—Continued

Item	Description of sample	Vitamin A value		Thiamin (vitamin B_1)		Ascorbic acid (vitamin C)		Vitamin D		Riboflavin		References
(1)	(2)	(3a)	(3b)	(4a)	(4b)	(5a)	(5b)	(6a)	(6b)	(7a)	(7b)	(8)
Milk—Continued. Cow—Continued. Dry—Continued. Whole—Con.	Spray process; U. S. A.; modified dye titration:	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
	Vacuum packed					6.9						293
	Reconstituted to 12.5 percent total solids						[3] 1.06					
	Commercial sample; U. S. A.; rat-growth method	1,600										29
	do			315								28
	2 samples; U. S. A.; photometric method									2,980 2,140		247
Fluid: Condensed, canned.	Sweetened, whole; [England]; thiochrome method			96								209
	Sweetened, whole; [England]; bradycardia method			120–180								13
	Sweetened, whole, commercial sample; U. S. A.; rat-growth method.	[3] ca 280										29
	do			[3] 72								28
	unsweetened, whole; [England]; thiochrome method			57								209
Evaporated	Chicago; rat-growth and rat-curative methods:											
	Newly evaporated, undiluted			[3] 50.2								232
	Stored 2 months at room temperature				[3] 40.0–43.7							
	Stored 4 months at room temperature				[3] 37.3–37.9							
	Chicago; rat-growth method:											
	Newly evaporated, undiluted			[3] 58.2								232
	Stored 8 months at room temperature				[3] 27.6							
	Irradiated; Chicago; rat-growth method:											
	Newly evaporated, undiluted			[3] 58.1								232
	Stored 8 months at room temperature				[3] 30.9							
Canned	Commercial processes; modified dye titration:											
	No preheaters; "hot wells" of tinned copper; evaporating pan of copper; Colorado.					[3] 2.76						
	No preheater; "hot wells" of nickel; evaporating pan of copper; Idaho.					[3] 1.58						
	Copper preheater; "hot wells" of stainless steel; evaporating pan of copper; Illinois.					[3] 1.58						
	Stainless steel preheater; "hot wells" of stainless steel and copper; evaporating pan of copper; Indiana.					[3] 1.58						
	Stainless steel preheater; "hot wells" of tinned copper; evaporating pan of copper; Iowa.					[3] 1.20						
	Tinned copper preheater; "hot wells" of nickel; evaporating pans of copper; Kentucky.					[3] 0.80						

Stainless steel preheater; "hot wells" of copper; evaporating pan of stainless steel; Maryland.					[3] 0.62						293
Stainless steel preheater; "hot wells" of stainless steel and copper; evaporating pan of stainless steel; Michigan.					[3] 0.80						
Copper preheater; "hot wells" of tinned copper; evaporating pan of tinned copper and stainless steel; Minnesota.					[3] 2.4						
No preheater; "hot wells" of nickel; evaporating pan of copper; Mississippi.					[3] 1.00						
Stainless steel preheater; "hot wells" of stainless steel or copper-nickel alloy; stainless steel evaporating pan; Missouri.					[3] 1.38						
Stainless steel preheater; "hot wells" of tinned copper; evaporating pan of copper; Ohio.					[3] 1.38						
Stainless steel preheater; "hot wells" of tinned copper and stainless steel; evaporating pan of copper; Oregon.					[3] 1.38						
Stainless steel preheater; "hot wells" of nickel; evaporating pan of copper; Tennessee.					[3] 0.80						
Tinned copper preheater; "hot wells" of tinned copper; evaporating pan of copper; Texas.					[3] 0.72						
No preheater; "hot wells" of nickel; evaporating pan of copper; Utah.					[3] 2.08						
Stainless steel preheater; "hot wells" of stainless steel; evaporating pan of copper; Virginia.					[3] 1.00						
Stainless steel preheater; "hot wells" of tinned copper; evaporating pan of copper; Washington.					[3] 0.40						
Stainless steel preheater; "hot wells" of stainless steel; evaporating pan of copper; Wisconsin.					[3] 1.92						
No preheater; "hot wells" of copper; evaporating pan of copper; Wisconsin.					[3] 1.58						
Copper preheater; "hot wells" of glass; evaporating pan of copper; Wisconsin.					[3] 0.85						
29 percent solids; England:											
Rat-growth method									260.		122
Fluorometric method									290.		
Average, 2 samples; Massachusetts							[3] 2.9				71
Commercial sample; U. S. A.; rat-growth method	[3] 464										29
do			[3] 51								28
Average and range, commercial samples from 19 States; U. S. A.; modified dye titration.					[3] 1.32 [3] 0.4–2.76						293
Range, commercial samples; U. S. A.; modified dye titration.					[3] 0.38–1.41						293

---

[3] Values per 100 ml.

Vitamin values per 100 grams of edible portions of foods—Continued

Item (1)	Description of sample (2)	Vitamin A value (3a)	Vitamin A value (3b)	Thiamin (vitamin B₁) (4a)	Thiamin (vitamin B₁) (4b)	Ascorbic acid (vitamin C) (5a)	Ascorbic acid (vitamin C) (5b)	Vitamin D (6a)	Vitamin D (6b)	Riboflavin (7a)	Riboflavin (7b)	References (8)
Milk—Continued.												
Cow—Continued.												
Fluid—Con.												
Canned—Con.	Irradiated; diluted 1:1; U. S. A.; rat-curative method:	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
	Freshly prepared								[3] **14.2**			154
	After storage 1½ years at 40°–110° F								[3] **14.2**			
	After storage 3¼ years at 40°–110° F								[3] **14.2**			
	Irradiated; average, 2 samples; Massachusetts								[3] 28.7			71
	Range for irradiated commercial samples; U. S. A.; modified dye titration.						[3] 0.67–2.23					293
	Vitamin D concentrate added; U. S. A.; modified dye titration.						[3] 1.95					293
Skim	Grade A, pasteurized; fat content ca 0.02 percent; June–August samples; Maryland; rat-growth method.			[3] 42								28
	Grade A, pasteurized; fat content ca 0.02 percent; July samples; Maryland; rat-growth method.	[4] ca 17										29
Whole	From 1 Ayrshire cow on standard dairy ration with rye pasture for 40 days before parturition; Kansas; single-feeding method:											
	1st day after parturition	2,541										152
	2d day after parturition	1,227										
	6th day after parturition	193										
	12th day after parturition	181										
	25th day after parturition	123										
	From 1 Ayrshire cow on standard dairy ration; no pasture; Kansas; single-feeding method:											
	1st day after parturition	1,816										152
	2d day after parturition	2,042										
	4th day after parturition	407										
	7th day after parturition	279										
	14th day after parturition	168										
	26th day after parturition	206										
	Raw, with cows in first 2 months lactation excluded; Kansas; dye titration:											
	Ayrshire herd					[3] 2.41						285
	Guernsey herd					[3] 2.60						
	Holstein herd					[3] 2.35						
	Jersey herd					[3] 2.92						
	From cows on grain, hay, and silage rations; Kansas; fluorometric method:											
	Ayrshire herd									[3] 117		283
	Guernsey herd									[3] 153		
	Holstein herd									[3] 143		
	do									[3] 137		
	Jersey herd									[3] 173		

Kansas; fluorometric method:											
Average for 8 Ayrshire cows, ½–5 months after parturition.	----	----	----	----	----	----	----	----	[3] 116	----	283
Average for 6 Ayrshire cows, 5–10 months after parturition.	----	----	----	----	----	----	----	----	[3] 116	----	
Average for 4 Guernsey cows, ½–5 months after parturition.	----	----	----	----	----	----	----	----	[3] 154	----	
Average for 7 Guernsey cows, 5–10 months after parturition.	----	----	----	----	----	----	----	----	[3] 151	----	
Average for 9 Holstein cows fed without pasture, ½–5 months after parturition.	----	----	----	----	----	----	----	----	[3] 124	----	
Average for 4 Holstein cows fed without pasture, 5–10 months after parturition.	----	----	----	----	----	----	----	----	[3] 135	----	
Average for 11 Holstein cows; ordinary ration with some pasture, ½–5 months after parturition.	----	----	----	----	----	----	----	----	[3] 129	----	
Average for 8 Holstein cows; ordinary ration with some pasture, 5–10 months after parturition.	----	----	----	----	----	----	----	----	[3] 138	----	
Average for 10 Jersey cows; ½–5 months after parturition.	----	----	----	----	----	----	----	----	[3] 160	----	
Average for 11 Jersey cows, 5–10 months after parturition.	----	----	----	----	----	----	----	----	[3] 158	----	
New York State; fluorometric method:											
Average and range, 9 analyses; Ayrshire cows, barn-fed.	----	----	----	----	----	----	----	----	[3] 169 [3] 126–208	----	107
Average and range, 10 analyses; Ayrshire cows, pasture-fed.	----	----	----	----	----	----	----	----	[3] 197 [3] 157–238	----	
Average and range, 4 analyses; Brown Swiss cows, barn-fed.	----	----	----	----	----	----	----	----	[3] 187 [3] 180–208	----	
Average and range, 5 analyses; Brown Swiss cows, pasture-fed.	----	----	----	----	----	----	----	----	[3] 237 [3] 200–262	----	
Average and range, 14 analyses; Guernsey cows, barn-fed.	----	----	----	----	----	----	----	----	[3] 191 [3] 164–272	----	
Average and range, 14 analyses; Guernsey cows, pasture-fed.	----	----	----	----	----	----	----	----	[3] 204 [3] 141–252	----	
Average and range, 22 analyses; Holstein cows, barn-fed.	----	----	----	----	----	----	----	----	[3] 142 [3] 60–231	----	
Average and range, 22 analyses; Holstein cows, pasture-fed.	----	----	----	----	----	----	----	----	[3] 164 [3] 119–244	----	
Average and range, 25 analyses; Jersey cows, barn-fed.	----	----	----	----	----	----	----	----	[3] 218 [3] 155–342	----	
Average and range, 24 analyses; Jersey cows, pasture-fed.	----	----	----	----	----	----	----	----	[3] 237 [3] 190–340	----	
Average and range, 74 analyses; mixed herd, barn-fed.	----	----	----	----	----	----	----	----	[3] 180 [3] 60–342	----	
Average and range, 76 analyses; mixed herd, pasture-fed.	----	----	----	----	----	----	----	----	[3] 204 [3] 119–340	----	
Average and range, 53 analyses; composite commercial samples of winter milk.	----	----	----	----	----	----	----	----	[3] 164 [3] 134–217	----	
Average and range, 50 analyses; composite commercial samples of summer milk.	----	----	----	----	----	----	----	----	[3] 197 [3] 160–227	----	
Most frequently observed value of milk from all cows.	----	----	----	----	----	----	----	----	[3] 200	----	

Values per 100 ml;

Vitamin values per 100 grams of edible portions of foods—Continued

Item	Description of sample	Vitamin A value		Thiamin (vitamin B$_1$)		Ascorbic acid (vitamin C)		Vitamin D		Riboflavin		References
(1)	(2)	(3a)	(3b)	(4a)	(4b)	(5a)	(5b)	(6a)	(6b)	(7a)	(7b)	(8)
Milk—Continued. Cow—Continued. Fluid—Con. Whole—Con.												
	Raw; average and range, morning samples from cows on dairy ration containing green feed; August-September; Pennsylvania; dye titration:	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
	Ayrshire	-------	-------	-------	-------	[3]1.36 [3]0.89–1.79	-------	-------	-------	-------	-------	214
	Brown Swiss	-------	-------	-------	-------	[3]1.56 [3]1.02–2.3	-------	-------	-------	-------	-------	
	Guernsey	-------	-------	-------	-------	[3]1.37 [3]0.73–1.95	-------	-------	-------	-------	-------	
	Holstein	-------	-------	-------	-------	[3]1.05 [3]0.73–1.33	-------	-------	-------	-------	-------	
	Jersey	-------	-------	-------	-------	[3]1.4 [3]0.78–2.02	-------	-------	-------	-------	-------	
	Raw; samples tested directly after milking; January; Wisconsin; dye titration:											
	From Brown Swiss; range for 3 days; cows pastured in summer.	-------	-------	-------	-------	[3]1.86–2.93	-------	-------	-------	-------	-------	292
	From Guernsey; range for 3 days; cows pastured in summer.	-------	-------	-------	-------	[3]1.68–2.96	-------	-------	-------	-------	-------	
	From Holstein; range for 3 days; cows on winter feed year round.	-------	-------	-------	-------	[3]1.46–2.92	-------	-------	-------	-------	-------	
	From Holstein; range for 3 days; cows pastured in summer.	-------	-------	-------	-------	[3]1.71–2.86	-------	-------	-------	-------	-------	
	From Jersey; range for 3 days; cows pastured in summer.	-------	-------	-------	-------	[3]1.54–3.18	-------	-------	-------	-------	-------	
	Kansas; fluorometric method:											
	Average, 4 Guernsey cows on alfalfa, silage, and grain ration.	-------	-------	-------	-------	-------	-------	-------	-------	220	-------	153
	Average, Guernsey cows on spring pasture, 3 weeks.	-------	-------	-------	-------	-------	-------	-------	-------	200	-------	
	Range, 11 Holstein cows on alfalfa, hay, silage, and grain ration.	-------	-------	-------	-------	-------	-------	-------	-------	160–200	-------	
	Range, 7 Holstein cows on rye pasture 2 weeks	-------	-------	-------	-------	-------	-------	-------	-------	188–250	-------	
	Average, 4 Holstein cows on spring pasture 3 weeks.	-------	-------	-------	-------	-------	-------	-------	-------	160	-------	

Range, 7 Holstein cows on prairie hay and grain mixture for over 2 years.									220–230		153
Range, 9 Jersey cows on alfalfa, hay, silage, and grain ration.									200–230		
Range, 5 Jersey cows on rye pasture 3 weeks									255–280		
Average, 4 Jersey cows on spring pasture 3 weeks.									230		
Average, cows of mixed herd on alfalfa, hay, silage, and grain ration.									200		
From 1 Guernsey cow on standard dairy ration with rye pasture for 58 days before parturition; Kansas; single-feeding method:											
1st day after parturition	2,756										152
2d day after parturition	1,927										
4th day after parturition	435										
9th day after parturition	234										
16th day after parturition	184										
26th day after parturition	168										
Raw; from Guernsey herd; Michigan; rat-curative method:											
July–September 1932; cows on pasture average 8 hours daily.							[3] 4.06–4.60				19
October 1932–April 1933; cows on pasture average 5 hours daily October, 2 hours daily November–April.							[3] 0.50–1.54				
May–September 1933; cows on pasture average 8 hours daily.							[3] 1.52–3.04				
October 1933–April 1934; cows on pasture average 5 hours daily October, 2 hours daily November–April.							[3] 0.62–1.88				
May 1934, cows on pasture 8 hours daily							[3] 1.67				
Raw certified; from Guernsey cows; stall-fed for 1 year, no fresh pasture; dye titration:											
From 1 cow 4 years old					[3] 1.94						132
From 1 cow 5 years old					[3] 1.90						
From 11 cows 6 years old					[3] 2.04						
From 9 cows 7 years old					[3] 2.19						
From 4 cows 8 years old					[3] 1.95						
From 1 cow 10 years old					[3] 1.87						
From 1 cow 11 years old					[3] 2.01						
Raw certified; from Guernsey cows, stall-fed for 1 year, no fresh pasture; average and range for 324 samples; dye titration.					[3] 2.05 [3] 1.66–2.51						130
From Guernsey herd; Wisconsin, Madison and Milwaukee distributors; spectrophotometric method:											
Average, January–May 1938	[1][3] 168.3										60
Average, January–May 1939	[1][3] 155.2										
Average, June–October 1938	[1][3] 256.4										
Average, June 1939	[1][3] 279.0										
Average, November–December 1938	[1][3] 205.1										

---

[1] International Unit values were calculated from carotene analyses or included carotene analyses.

[3] Values per 100 ml.

Vitamin values per 100 grams of edible portions of foods—Continued

Item (1)	Description of sample (2)	Vitamin A value (3a)	(3b)	Thiamin (vitamin B₁) (4a)	(4b)	Ascorbic acid (vitamin C) (5a)	(5b)	Vitamin D (6a)	(6b)	Riboflavin (7a)	(7b)	References (8)
Milk—Continued. Cow—Continued. Fluid—Con. Whole—Con.	Mixed market from Guernsey and Holstein herds; Wisconsin; spectrophotometric method:	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
	Average, January–May 1938	[1,3]134.5										60
	Average, January–May 1939	[1,3]113.0										
	Average, June–October 1938	[1,3]207.5										
	June 1939	[1,3]199.0										
	Average, November–December 1938	[1,3]168.6										
	From 7 Holstein cows on regular dairy ration; Kansas; rat-growth method:											
	September sample									200		155
	December sample									270		
	From 1 Holstein cow on standard dairy ration; no pasture; Kansas; single-feeding method:											
	1st day after parturition	1,620										152
	2d day after parturition	898										
	4th day after parturition	287										
	7th day after parturition	254										
	14th day after parturition	201										
	26th day after parturition	229										
	From 1 Holstein cow on ration of alfalfa hay and grain; Michigan; single-feeding method:											
	Range for entire year	[3]51–202										186
	Samples taken in June	[3]98										
	Samples taken in June with new hay in ration	[3]188										
	From 1 Holstein cow; Michigan; rat-growth method:											
	On winter ration, January–April	[3]87–141										186
	On winter ration, May	[3]104										
	After 2 weeks on May pasture	[3]188										
	On pasture, May–September	[3]163–282										
	On pasture, October–December	[3]127–224										
	Raw certified; from Holstein cows stall-fed for 1 year, no fresh pasture; average and range, 337 samples; dye titration.					[3]1.82 [3]1.37–2.16						130
	From 6 Holstein cows; South Dakota; rat-curative method:											
	Cows on winter ration, April sample							[3]0.84				277
	Cows on summer pasture, July sample							[3]3.38				
	After summer pasture, November sample							[3]0.95				

From Holstein cows; South Dakota; rat-curative method:											
Cows kept out of sunlight and given beet pulp as roughage for 2 months.	------	------	------	------	------	------	[3] 0.57	------	------	------	277
Cows given 20 pounds of alfalfa hay as roughage for 3 months.	------	------	------	------	------	------	[3] 1.37	------	------	------	
Cows given 20 pounds of prairie hay as roughage for 3 months.	------	------	------	------	------	------	[3] 0.89	------	------	------	
From Holstein cows receiving 19,000 I. U. of vitamin D daily from alfalfa hay; North Dakota; rat-curative method:											
1st month of lactation	------	------	------	------	------	------	[3] 1.2	------	------	------	275
2d–10th month of lactation	------	------	------	------	------	------	[3] 0.8–1.4	------	------	------	
11th–13th month of lactation	------	------	------	------	------	------	[3] 1–1.3	------	------	------	
Raw; from Holstein herd on dry lot; Michigan; rat-curative method:											
Range, July–September 1933; cows outdoors 7 hours daily, May–September.	------	------	------	------	------	------	[3] 1.81–2.18	------	------	------	19
Range, October 1933–April 1934; cows outdoors 2 hours daily.	------	------	------	------	------	------	[3] 0.79–1.32	------	------	------	
Average, May 1934; cows outdoors 7 hours daily.	------	------	------	------	------	------	[3] 1.46	------	------	------	
Raw, certified; from Holstein cows stall-fed for 1 year, no pasture; dye titration:											
From 4 cows 5 years old	------	------	------	------	[3] 1.53	------	------	------	------	------	132
From 10 cows 6 years old	------	------	------	------	[3] 1.86	------	------	------	------	------	
From 3 cows 7 years old	------	------	------	------	[3] 1.89	------	------	------	------	------	
From 4 cows 8 years old	------	------	------	------	[3] 1.91	------	------	------	------	------	
From 6 cows 9 years old	------	------	------	------	[3] 1.76	------	------	------	------	------	
Raw; from Holstein herd; Michigan; rat-curative method:											
Range, July–September 1932; cows on pasture average 8 hours daily.	------	------	------	------	------	------	[3] 1.88–2.92	------	------	------	19
Range, October 1932–April 1933; cows on pasture average 5 hours daily in October, average 2 hours daily November–April.	------	------	------	------	------	------	[3] 0.32–0.71	------	------	------	
Range, May–September 1933; cows on pasture average 8 hours daily.	------	------	------	------	------	------	[3] 0.74–1.75	------	------	------	
Range, October 1933–April 1934; cows on pasture average 5 hours daily in October, average 2 hours daily November–April.	------	------	------	------	------	------	[3] 0.33–0.64	------	------	------	
Average, May 1934; cows on pasture average 8 hours daily.	------	------	------	------	------	------	[3] 1.04	------	------	------	
From 5 Jersey cows on regular dairy ration; Kansas; rat-growth method:											
September sample	------	------	------	------	------	------	------	------	200	------	155
December sample	------	------	------	------	------	------	------	------	270	------	
From Jersey cows receiving 19,000 I. U. of vitamin D daily from alfalfa hay; North Dakota; rat-curative method:											
1st month of lactation	------	------	------	------	------	------	[3] 1.7	------	------	------	275
2d–5th month of lactation	------	------	------	------	------	------	[3] 3.3–3.5	------	------	------	
6th–11th month of lactation	------	------	------	------	------	------	[3] 2.6–3.5	------	------	------	

---

[1] International Unit values were calculated from carotene analyses or included carotene analyses.

[3] Values per 100 ml.

Vitamin values per 100 grams of edible portions of foods—Continued

Item	Description of sample	Vitamin A value		Thiamin (vitamin B_1)		Ascorbic acid (vitamin C)		Vitamin D		Riboflavin		Refer-ences
(1)	(2)	(3a)	(3b)	(4a)	(4b)	(5a)	(5b)	(6a)	(6b)	(7a)	(7b)	(8)
		I. U.	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
Milk—Continued. Cow—Continued. Fluid—Con. Whole—Con.	From Jersey cows; [England]; rat-growth method	[3] 540	------	------	------	------	------	------	------	------	------	46
	Raw; average, 502 analyses from 55 Holstein, Jersey, Guernsey, and Ayrshire cows; Kansas; dye titration.	------	------	------	------	[3] 2.59	------	------	------	------	------	284
	From 2 Shorthorn cows: England; rat-curative method:											
	Summer ration:											
	Cows on pasture	------	------	------	------	------	------	1.70	------	------	------	37
	Cows given fresh grass and kept indoors	------	------	------	------	------	------	0.53	------	------	------	
	Winter ration:											
	Cows kept indoors	------	------	------	------	------	------	0.83	------	------	------	
	Cows kept outdoors	------	------	------	------	------	------	2.60	------	------	------	
	From Shorthorn cows; England; dye titration:											
	Fresh	------	------	------	------	[3] 2.38	------	------	------	------	------	151
	After ½ hour exposure to sunlight in a pint bottle.	------	------	------	------	------	[3] 1.41	------	------	------	------	
	Range from Michigan dairies; cows pastured as early and late as conditions permitted; rat-curative method:											
	Range, July–September 1933	------	------	------	------	------	------	[3] 1.89–2.77	------	------	------	19
	Range, October 1933–April 1934	------	------	------	------	------	------	[3] 0.82–1.38	------	------	------	
	Range, May–June 1934	------	------	------	------	------	------	[3] 1.2–1.89	------	------	------	
	From herd of about 150 cows on diet of grain, hay, corn silage, and beet pulp providing about 2,000 I. U. of vitamin A per cow per day; Massachusetts; rat-growth method:											
	Cows receiving no supplement; 1936	[3] 47	------	------	------	------	------	------	------	------	------	5
	Cows receiving concentrate providing 30,000 I. U. vitamin A per cow per day; 1936.	[3] 214	------	------	------	------	------	------	------	------	------	
	Cows without supplement; 1937	[3] 290	------	------	------	------	------	------	------	------	------	
	Cows receiving concentrate providing 30,000 I. U. vitamin A per cow per day; 1937.	[3] 380	------	------	------	------	------	------	------	------	------	
	Raw; evening samples; titrated within 2 hours; dye titration:											
	From cows on dry ration and silage mid-March–May.	------	------	------	------	[3] 2.58	------	------	------	------	------	221
	From cows on pasture late March–May	------	------	------	------	[3] 2.65	------	------	------	------	------	
	From cows on dry ration, mid-March–May	------	------	------	------	[3] 2.68	------	------	------	------	------	

Average, samples from 12 cows; U. S. A.; dye titration:											
Raw					[3] **1.99**						92
Raw, stored 5 days						[3] **1.36**					
Pasteurized, stored 5 days						[3] **1.32**					
From 12 cows receiving beet pulp; U. S. A.; dye titration:											
Raw					[3] **1.96**						92
Raw, stored 5 days						[3] **1.32**					
Pasteurized, stored 5 days						[3] **1.26**					
From 12 cows receiving corn silage; U. S. A.; dye titration:											
Raw					[3] **1.95**						92
Raw, stored 5 days						[3] **1.36**					
Pasteurized, stored 5 days						[3] **1.37**					
From 12 cows receiving molasses, grass silage; U. S. A.; dye titration:											
Raw					[3] **2.02**						92
Raw, stored 5 days						[3] **1.46**					
Pasteurized, stored 5 days						[3] **1.47**					
Certified; from Milwaukee distributors; Wisconsin; spectrophotometric method:											
Average, January–May 1938	[1] [3] 151.9										60
Average, January–May 1939	[1] [3] 137.2										
Average, June–October 1938	[1] [3] 211.1										
June 1939	[1] [3] 255.3										
Average, November–December 1938	[1] [3] 191.5										
Mixed market vitamin D milk; Wisconsin; spectrophotometric method:											
Average, January–May 1938	[1] [3] 140.1										60
Average, January–May 1939	[1] [3] 112.7										
Average, June–October 1938	[1] [3] 194.2										
June 1939	[1] [3] 218.2										
Average, November–December 1938	[1] [3] 174.1										
Mixed samples from creamery; Michigan; single-feeding method:											
January–April samples	[3] 76–105										186
May–September samples	[3] 163–271										
October–December samples	[3] 137–166										
Raw, from large mixed dairy herd, October–April; Kansas; dye titration:											
Average and range					[3] 2.55						285
Range, with cows in first 2 months of lactation excluded.					[3] 2.22–2.92 [3] 2.28–2.97						

---

[1] International Unit values were calculated from carotene analyses or included carotene analyses.
[3] Values per 100 ml.

Vitamin values per 100 grams of edible portions of foods—Continued

Item	Description of sample	Vitamin A value		Thiamin (vitamin B₁)		Ascorbic acid (vitamin C)		Vitamin D		Riboflavin		References
(1)	(2)	(3a)	(3b)	(4a)	(4b)	(5a)	(5b)	(6a)	(6b)	(7a)	(7b)	(8)
Milk—Continued. Cow—Continued. Fluid—Con. Whole—Con.												
	Grade A, raw, from college herd; Michigan; dye titration:											
	Winter season:	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
	1-day storage					[3] 0.6						267
	2-day storage						[3] 0.48					
	3-day storage						[3] 0.13					
	4-day storage						[3] 0.06					
	Spring season:											
	1-day storage					[3] 1.05						
	2-day storage						[3] 0.6					
	3-day storage						[3] 0.34					
	4-day storage						[3] 0.18					
	Summer season:											
	1-day storage					[3] 0.88						
	2-day storage						[3] 0.64					
	3-day storage						[3] 0.47					
	4-day storage						[3] 0.33					
	Autumn season:											
	1-day storage					[3] 0.77						
	2-day storage						[3] 0.42					
	3-day storage						[3] 0.25					
	4-day storage						[3] 0.12					
	Holder pasteurized, pooled samples of 30 producers; Michigan; dye titration:											
	Winter season:											
	1-day storage					[3] 0.99						267
	2-day storage						[3] 0.58					
	3-day storage						[3] 0.31					
	4-day storage						[3] 0.08					
	Spring season:											
	1-day storage					[3] 1.29						
	2-day storage						[3] 0.76					
	3-day storage						[3] 0.40					
	4-day storage						[3] 0.22					
	Summer season:											
	1-day storage					[3] 1.30						
	2-day storage						[3] 0.95					
	3-day storage						[3] 0.58					
	4-day storage						[3] 0.33					
	Autumn season:											
	1-day storage					[3] 1.30						
	2-day storage						[3] 0.94					
	3-day storage						[3] 0.68					
	4-day storage						[3] 0.34					

Irradiated, pasteurized 30 minutes at 142°-143° F.; collected from college herd; Michigan; dye titration:											
Winter season:											
1-day storage	----	----	----	----	[3]0.72	----	----	----	----	----	267
2-day storage	----	----	----	----	----	[3]0.25	----	----	----	----	
3-day storage	----	----	----	----	----	[3]0.04	----	----	----	----	
4-day storage	----	----	----	----	----	[3]0	----	----	----	----	
Spring season:											
1-day storage	----	----	----	----	[3]1.11	----	----	----	----	----	
2-day storage	----	----	----	----	----	[3]0.61	----	----	----	----	
3-day storage	----	----	----	----	----	[3]0.20	----	----	----	----	
4-day storage	----	----	----	----	----	[3]0.07	----	----	----	----	
Summer season:											
1-day storage	----	----	----	----	[3]1.42	----	----	----	----	----	
2-day storage	----	----	----	----	----	[3]0.91	----	----	----	----	
3-day storage	----	----	----	----	----	[3]0.47	----	----	----	----	
4-day storage	----	----	----	----	----	[3]0.22	----	----	----	----	
Autumn season:											
1-day storage	----	----	----	----	[3]1.09	----	----	----	----	----	
2-day storage	----	----	----	----	----	[3]0.61	----	----	----	----	
3-day storage	----	----	----	----	----	[3]0.28	----	----	----	----	
4-day storage	----	----	----	----	----	[3]0.12	----	----	----	----	
Raw; Kansas; dye titration:											
Direct from aluminum milk pail	----	----	----	----	[3]2.57	----	----	----	----	----	286
do	----	----	----	----	[3]2.50	----	----	----	----	----	
Strained, cooled, stored 1 day at 40° F	----	----	----	----	----	[3]2.33	----	----	----	----	
Strained, cooled	----	----	----	----	[3]2.16	----	----	----	----	----	
Strained, cooled, stored 1 day at 40° F	----	----	----	----	----	[3]1.54	----	----	----	----	
Kansas; dye titration:											
Raw	----	----	----	----	[3]2.10	----	----	----	----	----	
Raw, stored 1 day at 40° F	----	----	----	----	----	[3]1.99	----	----	----	----	
Pasteurized 1 minute at 160° F	----	----	----	----	----	[3]2.13	----	----	----	----	
Pasteurized 1 minute at 160° F., stored 1 day at 40° F.	----	----	----	----	----	[3]2.07	----	----	----	----	
Average, samples from 20 cows; college herd; Michigan; dye titration:											
Raw	----	----	----	----	[3]2.07	----	----	----	----	----	97
Raw, stored 1 day at 5° C	----	----	----	----	----	[3]1.71	----	----	----	----	
Raw, stored 2 days at 5° C	----	----	----	----	----	[3]1.13	----	----	----	----	
Raw, stored 3 days at 5° C	----	----	----	----	----	[3]0.62	----	----	----	----	
Pasteurized 30 minutes at 63° C.; stored 1 day at 5° C.	----	----	----	----	----	[3]1.59	----	----	----	----	
Pasteurized 30 minutes at 63° C., stored 2 days at 5° C.	----	----	----	----	----	[3]1.17	----	----	----	----	
Pasteurized 30 minutes at 63° C., stored 3 days at 5° C.	----	----	----	----	----	[3]0.87	----	----	----	----	
Pasteurized 30 minutes at 75° C., stored 1 day at 5° C.	----	----	----	----	----	[3]1.49	----	----	----	----	
Pasteurized 30 minutes at 75° C., stored 2 days at 5° C.	----	----	----	----	----	[3]1.36	----	----	----	----	
Pasteurized 30 minutes at 75° C., stored 3 days at 5° C.	----	----	----	----	----	[3]1.21	----	----	----	----	

Values per 100 ml.

Vitamin values per 100 grams of edible portions of foods—Continued

Item (1)	Description of sample (2)	Vitamin A value (3a)	(3b)	Thiamin (vitamin B_1) (4a)	(4b)	Ascorbic acid (vitamin C) (5a)	(5b)	Vitamin D (6a)	(6b)	Riboflavin (7a)	(7b)	References (8)
Milk—Continued. Cow—Continued. Fluid—Con. Whole—Con.	Kansas; dye titration:	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
	Raw					[3] 2.05						286
	Raw, stored 9 hours at 40° F						[3] 1.75					
	Raw, stored 1 day at 40° F						[3] 1.25					
	Pasteurized 30 minutes at 143° F						[3] 1.58					
	Pasteurized 30 minutes at 143° F., stored 9 hours at 40° F.						[3] 1.33					
	Pasteurized 30 minutes at 143° F., stored 1 day at 40° F.						[3] 1.02					
	U. S. A.; dye titration:											
	Raw					[3] 1.0						145
	Vat pasteurized						[3] 0.4					
	Pasteurized by electrical conductivity method						[3] 1.0					
	Pasteurized by flash contact method						[3] 1.0					
	U. S. A.; dye titration:											
	Raw					[3] 2.0						106
	Raw, stored in bottle 3 days at 1°-3° C						[3] 1.4					
	Raw, stored in bottle 7 days at 1°-3° C						[3] 0.2					
	Freed of oxygen, stored in bottles 3 days at 1°-3° C.						[3] 1.9					
	Freed of oxygen, stored in bottle 7 days at 1°-3° C.						[3] 1.9					
	Pasteurized, stored in bottle 3 days at 1°-3° C						[3] 1.4					
	Pasteurized, stored in bottle 7 days at 1°-3° C						[3] 0.4					
	Pasteurized, freed of oxygen, stored in bottle 3 days at 1°-3° C.						[3] 2.0					
	Pasteurized, freed of oxygen, stored in bottle 7 days at 1°-3° C.						[3] 2.0					
	Wisconsin; modified dye titration:											
	Raw					[3] 1.9						294
	After spray vat (steel, vertical) pasteurization for 30 minutes at 150° F.						[3] 1.5					
	Raw					[3] 2.1						
	After spray vat (stainless steel, horizontal) pasteurization for 30 minutes at 145° C.						[3] 1.5					
	Raw					[3] 1.9						
	After pasteurization in stainless steel vat 30 minutes at 150° F.						[3] 1.5					
	After homogenization at 150° F. and 2,000 pounds pressure.						[3] 1.4					
	Pasteurized 30 minutes at 150° F.					[3] 1.7						

After exposure to light 1 hour in 1 quart clear glass vessel.	-----	-----	-----	-----	-----	[3] 1.6	-----	-----	-----	-----	
After exposure to light 1 hour in 1 quart brown vessel.	-----	-----	-----	-----	-----	[3] 1.7	-----	-----	-----	-----	
After exposure to light in 1 quart waxed container.	-----	-----	-----	-----	-----	[3] 1.7	-----	-----	-----	-----	
After exposure to light 1 hour in 1 quart clear glass vessel, stored 8 hours at 40° F.	-----	-----	-----	-----	-----	[3] 1.0	-----	-----	-----	-----	
From mixed herd; average and range, bimonthly samples over 18-month period; Massachusetts; dye titration:											
Certified	-----	-----	-----	-----	[3] 1.73 [3] 1.41–2.19	-----	-----	-----	-----	-----	131
Pasteurized 30 minutes at 143° F. in stainless steel spray vats.	-----	-----	-----	-----	-----	[3] 1.40 [3] 0.78–1.90	-----	-----	-----	-----	
Chicago; rat-growth method:											
Raw	-----	-----	[3] 33.2	-----	-----	-----	-----	-----	-----	-----	232
Newly evaporated, reconstituted	-----	-----	-----	[3] 25.1	-----	-----	-----	-----	-----	-----	
Raw	-----	-----	[3] 29.0	-----	-----	-----	-----	-----	-----	-----	
Newly evaporated, reconstituted	-----	-----	-----	[3] 19.3	-----	-----	-----	-----	-----	-----	
Raw	-----	-----	[3] 37.0	-----	-----	-----	-----	-----	-----	-----	
Newly evaporated, reconstituted	-----	-----	-----	[3] 29.1	-----	-----	-----	-----	-----	-----	
Raw	-----	-----	[3] 37.0	-----	-----	-----	-----	-----	-----	-----	
Irradiated, newly evaporated, reconstituted	-----	-----	-----	[3] 29.0	-----	-----	-----	-----	-----	-----	
Average for commercial; raw; dairy samples; Wisconsin; dye titration.	-----	-----	-----	-----	[3] 1.73	-----	-----	-----	-----	-----	292
Raw; commercial dairy samples; Wisconsin; dye titration:											
Grade A	-----	-----	-----	-----	[3] 1.67	-----	-----	-----	-----	-----	292
Grade A Guernsey	-----	-----	-----	-----	[3] 2.01	-----	-----	-----	-----	-----	
Certified	-----	-----	-----	-----	[3] 1.85–2.16	-----	-----	-----	-----	-----	
Certified Guernsey	-----	-----	-----	-----	[3] 1.32–1.87	-----	-----	-----	-----	-----	
Certified vitamin D (cod-liver oil)	-----	-----	-----	-----	[3] 1.21–1.39	-----	-----	-----	-----	-----	
Average and range; Amsterdam market; August and September 1937; thiochrome method.	-----	-----	[3] 20.3 [3] 15.0–31.0	-----	-----		-----	-----	-----	-----	287
Amsterdam market sample; thiochrome method:											
Raw, August	-----	-----	[3] 20.6	-----	-----	-----	-----	-----	-----	-----	287
Pasteurized	-----	-----	-----	[3] 20.6	-----	-----	-----	-----	-----	-----	
Raw, August	-----	-----	[3] 21.7	-----	-----	-----	-----	-----	-----	-----	
Pasteurized	-----	-----	-----	[3] 21.5	-----	-----	-----	-----	-----	-----	
Raw, March	-----	-----	[3] 23.7	-----	-----	-----	-----	-----	-----	-----	
Raw	-----	-----	[3] 25.5	-----	-----	-----	-----	-----	-----	-----	
Cooked 5 minutes	-----	-----	-----	[3] 25.0	-----	-----	-----	-----	-----	-----	
Cooked 15 minutes	-----	-----	-----	[3] 22.5	-----	-----	-----	-----	-----	-----	
Cooked 60 minutes	-----	-----	-----	[3] 17.0	-----	-----	-----	-----	-----	-----	

---

[3] Values per 100 ml.

Vitamin values per 100 grams of edible portions of foods—Continued

Item (1)	Description of sample (2)	Vitamin A value (3a)	Vitamin A value (3b)	Thiamin (vitamin B1) (4a)	Thiamin (vitamin B1) (4b)	Ascorbic acid (vitamin C) (5a)	Ascorbic acid (vitamin C) (5b)	Vitamin D (6a)	Vitamin D (6b)	Riboflavin (7a)	Riboflavin (7b)	References (8)
Milk—Continued. Cow—Continued. Fluid—Con. Whole—Con.		*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
	Raw; average and range, 243 cows on 21 farms; Rumania; dye titration.					[3] 14.5 1.3–29.2						270
	Pasteurized; average and range, 10 cows on 1 farm; Rumania; dye titration.					[3] 14.3 11.6–16.9						270
	Raw; average and range, 11 cows; exposed to sunlight 1 hour; Rumania; dye titration.						[3] 3.5 1.1–7.4					270
	Raw; average and range, 19 samples; U. S. A.; dye titration.					[3] 1.65 1.0–2.4						118
	Raw, May–June, 4 samples; Massachusetts							[3] 2.9+				71
	Raw, October–November, 3 samples; Massachusetts.							[3] 2.1				71
	Certified, metabolized (yeast) milk, 3 samples; Massachusetts.								[3] 42+			71
	Raw; England; thiochrome method			[3] 27								207
	Average and range, 7 samples; India; dye titration:											
	Raw					[3] .7 **0.2–1.1**						38
	Boiled						[3] **0.4** **0.1–0.7**					
	Raw; Pennsylvania; dye titration					[3] 2.29						148
	Rumania; dye titration:											
	Raw					2.1–2.4						204
	Cooked						1.2–1.5					
	Collected without exposure to air, metals, or light into chilled glass vessel; Pennsylvania; dye titration.					[3] 2.29–2.30						148
	Pasteurized; England; thiochrome method			[3] 42								207
	Pasteurized, grade A, samples from 3 dairies; Maryland; rat-growth method:											
	March	[3] 87										29
	July	[3] 230										
	Pasteurized; Maryland; rat-growth method			[3] 48								28
	Pasteurized, autumn, 4 samples; Massachusetts							[3] 2.1				71
	Pasteurized, homogenized, autumn, 2 samples; Massachusetts.							[3] 2.1				71
	Pasteurized, irradiated; average, 245 samples; Massachusetts.								[3] 14.3			71
	Pasteurized, metabolized (yeast) milk, 5 samples; Massachusetts.								[3] 42+			71

Pasteurized; average and range, 100 samples; U. S. A.; dye titration.					[3] 0.897 0.5–1.40						118
Pasteurized, grade B; U. S. A.; dye titration					[3] 7						255
Pasteurized; U. S. A.; dye titration					[3] 0.1						43
Pasteurized, average for commercial dairy sample; Wisconsin; dye titration.					[3] 1.26						292
Pasteurized, commercial dairy samples; Wisconsin; dye titration:											
Guernsey					[3] 0.56–1.66						292
Grade A					[3] 0.74–1.51						
No description					[3] 0.94–1.77						
Pasteurized, commercial samples; Wisconsin; dye titration:											
Grade A; vitamin D (irradiated ergosterol)					[3] 0.74						292
Vitamin D (irradiated ergosterol)					[3] 0.98						
Vitamin D (cows fed irradiated yeast)					[3] 1.37						
Homogenized vitamin D (cows fed irradiated yeast).					[3] 1.11						
Mineral modified					[3] 0.81						
From winter herd on regular dairy ration; Kansas; rat-growth method.									200		155
Average and range, 5 samples; Kansas:											
Fluorometric method									[3] 214 [3] 176–255		282
Rat-growth method									[3] 232 [3] 200–260		
England; bradycardia method			69								11
May samples; England; thiochrome method			[3] 75								207
[England]; rat-growth method	[3] 300						[3] 0–10				46
England; thiochrome method			30								209
Average, 57 samples; Germany; dye titration					1–2						298
Germany; dye titration					[3] 0.07–2.2						198
India; dye titration					0.4						211
India; fluorometric method									127		195
Japan; lumiflavin method									69.5		249
New York; dye titration					[3] 1.88						213
do					[3] 2.03						213
Sweden; fluorometric method									[3] 200–300		67
U. S. A.; thiochrome method			38–51								120
U. S. A.; dye titration					0.80						68
2 samples; U. S. A.; microbiological method									169 200		242
Range; U. S. A.; microbiological method									150–250		242
Fresh; single sample:											
Oxidation method									275		163
Rat-growth method									240		
Held at boiling point for 15 minutes; average and range, 27 samples; U. S. A.; dye titration.						[3] 0.61 0.4–0.9					118
Sterilized; England; thiochrome method				[3] 12							207

---

[3] Values per 100 ml.

Vitamin values per 100 grams of edible portions of foods—Continued

Item	Description of sample	Vitamin A value		Thiamin (vitamin B1)		Ascorbic acid (vitamin C)		Vitamin D		Riboflavin		References
(1)	(2)	(3a)	(3b)	(4a)	(4b)	(5a)	(5b)	(6a)	(6b)	(7a)	(7b)	(8)
		I. U.	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
Milk—Continued.												
Goat	Whole, from Toggenburg goats, October 1938–August 1939, 360 samples; U. S. A.; dye titration.					0.5–2.0						220
	Whole, fluid; average and range, 5 samples; India; dye titration:											
	Raw					[3] 0.9 0.7–1.1						38
	Boiled						[3] 0.4 0.1–0.7					
	Whole, fluid; India; dye titration					8.5						225
	Whole, fluid; Japan; lumiflavin method									81.6		249
Evaporated	Commercial; U. S. A.; modified dye titration					[3] 1.48						293
Human	Boston; bioassay							[3] 0.4				115
	After feeding diets high in ascorbic acid value; China; dye titration.					[3] 8						40
	England; rat-curative method:											
	January–June							[3] 2–18				61
	July–December							[3] 4–9				
	January–February							[3] 3.5–6.5				
	Germany; dye titration					[3] 0.6–11.4						198
	do					[3] 4–7						198
	Average and range, 7 samples; India; dye titration					[3] 3.5 2.1–6.0						38
	Japan; lumiflavin method									25.3		249
	Raw; U. S. A.; dye titration:											
	No supplement; 3–6 days postpartum					[3] 5.3						237
	No supplement; 10 days postpartum					[3] 6.4						
	No supplement; 3–6 days postpartum					[3] 5.6						
	Supplemented with 210 mg. vitamin C (orange juice); 10 days postpartum.						[3] 7.3					
	No supplement; 3–6 days postpartum					[3] 5.5						
	Supplemented with 430 mg. vitamin C (orange juice); 10 days postpartum.						[3] 8.1					
Sheep	Average, 57 samples; Germany; dye titration					3.18						298
Milkweed	Ohio; dye titration					655.6						35
	Smaller leaved; Ohio; dye titration					253.7						35
Millet	Common F. C. No. 22,637; obtained, Washington, D. C.; fermentation method.			750								235
	German F. C. No. 22,636; Tennessee; obtained, Washington, D. C.; fermentation method.			600								
	Yellow Manitoba proso; Colorado; obtained, Washington, D. C.; fermentation method.			820								
	Juba; England; bradycardia method			180–360								13

Molasses	Beet molasses; Germany; rat-assay									0		103
	Beet molasses; Michigan; rat-assay									0		103
	Refined cane; commercial sample; rat-assay									0		103
	"Treacle" (England); thiochrome method			18								209
	Commercial sample of brown baking molasses; U. S. A.; rat-growth method.			Trace								28
	do	Nil										29
	Commercial sample of baking molasses; U. S. A.; rat-growth method.			ca 55								(6)
	Cuban; microbiological method									112		(10)
	Dominican; low potassium; microbiological method.									220		
	Dominican; high potassium; microbiological method.									175		
	Porto Rican; microbiological method									280		
	Blackstrap; Cuban; microbiological method									252		
	Blackstrap; Cuban; rat-growth method			84								(6)
	Blackstrap; Hawaiian; microbiological method									240		(10)
	Blackstrap; Porto Rican; rat-growth method			87								(6)
	Blackstrap; San Dominican; rat-growth method			120								(6)
	Blackstrap, commercial; Louisiana; rat-assay									Trace		103
Mulberry	Freshly picked; western Australia; dye titration					8						123
	do					13						123
Mushroom	*Agaricus campestris;* U.S.A.; rat-growth method	Nil										29
	[England]; bradycardia method			150								11
	Germany; dye titration:											
	Fresh					7.6						59
	Blanched						[4] 3.0					
	Canned in glass						[4] 2.1					
	Canned in tin						[4] 3.2					
	Range, 17 varieties; 86–94.5 percent moisture; Japan; lumiflavin method.									31.7–197.3		249
	Thiochrome method			114								209
Dried	Range, 4 varieties; 10.2–21.5 percent moisture; Japan; lumiflavin method.									277.9–989.5		249
Muskmelon	Aristocrat; average, 4 samples; New York; dye titration.					37						280
	Aristocrat; freshly harvested; Ohio; dye titration					29						274
	Baltimore; North Carolina market; dye titration:											
	Average, 15 melons					28.1						192
	Average, 11 ripe melons					31.7						
	Average, 4 very ripe melons					18.2						

[3] Values per 100 ml.
[4] Values on raw-weight basis.
[6] Unpublished data, Bureau of Home Economics.
[10] Unpublished data from H. J. Prebluda, H. M. Hodge, N. M. Erb, and F. M. Hildebrandt, U. S. Industrial Chemicals, Inc., Baltimore, Md.

Vitamin values per 100 grams of edible portions of foods—Continued

Item (1)	Description of sample (2)	Vitamin A value (3a)	 (3b)	Thiamin (vitamin B_1) (4a)	 (4b)	Ascorbic acid (vitamin C) (5a)	 (5b)	Vitamin D (6a)	 (6b)	Riboflavin (7a)	 (7b)	References (8)
		I. U.	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
Muskmelon—Con.	Banana; North Carolina market; dye titration:											
	Average, 18 melons	----	----	----	----	20.9	----	----	----	----	----	192
	Average, 12 ripe melons	----	----	----	----	25.4	----	----	----	----	----	
	Average, 6 very ripe melons	----	----	----	----	11.9	----	----	----	----	----	
	Bender's Surprise; average, 6 samples; New York; dye titration.	----	----	----	----	23	----	----	----	----	----	280
	Bender's Surprise; freshly harvested; Ohio; dye titration.	----	----	----	----	24	----	----	----	----	----	274
	Bottomly; freshly harvested; Ohio; dye titration	----	----	----	----	35	----	----	----	----	----	274
	Cooper's Sweetheart; average, 4 samples; New York; dye titration.	----	----	----	----	25	----	----	----	----	----	280
	Delicious; freshly harvested; Ohio; dye titration	----	----	----	----	32	----	----	----	----	----	274
	do	----	----	----	----	36	----	----	----	----	----	274
	Early Osage; freshly harvested; Ohio; dye titration	----	----	----	----	32	----	----	----	----	----	274
	Globe of Gold; freshly harvested; Ohio; dye titration.	----	----	----	----	30	----	----	----	----	----	274
	Golden Marvel; average, 4 samples; New York; dye titration.	----	----	----	----	38	----	----	----	----	----	280
	Hale's Best; North Carolina market; dye titration:											
	Average, 16 melons	----	----	----	----	25.5	----	----	----	----	----	192
	Average, 12 ripe melons	----	----	----	----	25.9	----	----	----	----	----	
	Average, 3 very ripe melons	----	----	----	----	25.0	----	----	----	----	----	
	Hale's Best; freshly harvested; Ohio; dye titration	----	----	----	----	38	----	----	----	----	----	274
	Hale's Best; average and range, 3 samples; Texas; dye titration.	----	----	----	----	33.3 31.8–35.5	----	----	----	----	----	85
	Hearts of Gold; freshly harvested; Ohio; dye titration.	----	----	----	----	35	----	----	----	----	----	274
	Hearts of Gold; average and range, 6 samples; Texas; dye titration.	----	----	----	----	24.3 17.7–32.1	----	----	----	----	----	85
	Honey Ball; Texas; dye titration	----	----	----	----	30.7	----	----	----	----	----	85
	Honey Dew; Texas; dye titration	----	----	----	----	7.3	----	----	----	----	----	85
	Honey Dew; U. S. A.; dye titration	----	----	----	----	94.2	----	----	----	----	----	34
	Honey Rock; average, 4 samples; New York; dye titration.	----	----	----	----	48	----	----	----	----	----	280
	Honey Rock; freshly harvested; Ohio; dye titration.	----	----	----	----	41	----	----	----	----	----	274
	Improved Hale's Best; freshly harvested; Ohio; dye titration.	----	----	----	----	37	----	----	----	----	----	274
	Improved No. 45; freshly harvested; Ohio; dye titration.	----	----	----	----	16	----	----	----	----	----	274
	Large Late Hackensack; freshly harvested; Ohio; dye titration.	----	----	----	----	36	----	----	----	----	----	274

Market King; freshly harvested; Ohio; dye titration.	------	------	------	------	57	------	------	------	------	------	274
Netted Gem; Texas; dye titration	------	------	------	------	37.1	------	------	------	------	------	85
New Wonderful; average, 4 samples; New York; dye titration.	------	------	------	------	24	------	------	------	------	------	280
Perfecto; North Carolina market; dye titration:											
Average, 17 melons	------	------	------	------	30.6	------	------	------	------	------	192
Average, 8 ripe melons	------	------	------	------	32.3	------	------	------	------	------	
Average, 5 very ripe melons	------	------	------	------	26.6	------	------	------	------	------	
Polish No. 1; garden fresh; Ohio; dye titration	------	------	------	------	37.4	------	------	------	------	------	34
Rock melon; Honey Dew variety; freshly picked; western Australia; dye titration.	------	------	------	------	21	------	------	------	------	------	123
Rock melon; freshly picked; western Australia; dye titration.	------	------	------	------	10	------	------	------	------	------	123
Rocky Ford; Washington, D. C., market; Colorado; rat-growth method.	2,390	------	------	------	------	------	------	------	------	------	29
Rocky Ford; North Carolina market; dye titration:											
Average, 20 melons	------	------	------	------	31.2	------	------	------	------	------	192
Average, 17 ripe melons	------	------	------	------	32.6	------	------	------	------	------	
1 very ripe melon	------	------	------	------	25.4	------	------	------	------	------	
Rocky Ford; average and range, 10 samples; ripe, good flavor; North Carolina market; dye titration.	------	------	------	------	34.26 29.1–38.2	------	------	------	------	------	192
Rocky Ford; North Carolina market; dye titration:											
Ripe:											
Fair flavor; average and range, 6 samples	------	------	------	------	31.0 25.4–37.9	------	------	------	------	------	192
Poor flavor, 1 melon	------	------	------	------	26.3	------	------	------	------	------	
Almost ripe; fair flavor	------	------	------	------	22.6	------	------	------	------	------	
Green, poor flavor	------	------	------	------	21.6	------	------	------	------	------	
Very ripe, poor flavor	------	------	------	------	25.4	------	------	------	------	------	
Rocky Ford; average and range, 6 samples; Texas; dye titration.	------	------	------	------	26.4 19.3–34.5	------	------	------	------	------	85
Sugar Cup; freshly harvested; Ohio; dye titration	------	------	------	------	31	------	------	------	------	------	274
Superfecto; freshly harvested; Ohio; dye titration	------	------	------	------	56	------	------	------	------	------	274
Wood's Perfection; North Carolina market; dye titration:											
Average, 13 melons	------	------	------	------	28.9	------	------	------	------	------	192
Average, 11 ripe melons	------	------	------	------	29.1	------	------	------	------	------	
Average, 2 very ripe melons	------	------	------	------	28.1	------	------	------	------	------	
Average, 7 varieties (Rocky Ford, Perfecto, Baltimore, Wood's Perfection, Hale's Best, and Banana); 99 samples; North Carolina market; dye titration.	------	------	------	------	27.5	------	------	------	------	------	192
China; dye titration	------	------	------	------	13.3	------	------	------	------	------	41
New York; fluorometric method	------	------	------	------	------	------	------	------	73	------	126
Large melons; average and range, 3 samples; Texas; dye titration.	------	------	------	------	12.2 7.3–18	------	------	------	------	------	85
U. S. A.; rat-growth method	------	------	57	------	------	------	------	------	------	------	28

Vitamin values per 100 grams of edible portions of foods—Continued

Item (1)	Description of sample (2)	Vitamin A value (3a)	Vitamin A value (3b)	Thiamin (vitamin B₁) (4a)	Thiamin (vitamin B₁) (4b)	Ascorbic acid (vitamin C) (5a)	Ascorbic acid (vitamin C) (5b)	Vitamin D (6a)	Vitamin D (6b)	Riboflavin (7a)	Riboflavin (7b)	References (8)
		I. U.	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
Muskmelon—Con. Various parts	Bender's Surprise; New York; dye titration:											
	Ripe, yellow portion					33						280
	Ripe, green portion					24						
	Unripe, yellow portion					18						
	Unripe, green portion					8						
	Nearly ripe, yellow portion					31						
	Nearly ripe, green portion					14						
	Overripe, yellow portion					15						
	Overripe, green portion					11						
Mustard greens	Average, 2 samples; Texas; dye titration					165.0						85
	Purchased on Washington, D. C., market from October–December; rat-growth method:											
	Raw	ca **10,200**										29
	Cooked		[4] ca **10,000**									
	U. S. A.; dye titration					179.0						34
	U. S. A.; rat-growth method			138								28
Mutton	Lean, raw; [England]; bradycardia method			180								11
	[England]; thiochrome method			102								209
	Leg; Germany; chromatographic and colorimetric method:											
	Lean sample									69.4		233
	Fat sample									100.4		
Nectarine	Freshly picked; western Australia; dye titration					8						123
Nuts (see Almond, Walnut, etc).												
Oat: Plant	Iogold; Michigan; colorimetric method:											
	6-inch high	[1] 12,500										243
	8-inch high	[1] 11,000										
	10-inch high	[1] 11,000										
	15-inch high	[1] 8,750										
	18-inch high	[1] 6,000										
	Dried; 1 sample; U. S. A.:											
	Microbiological method										[2] **3,030**	242
	Rat-growth method										[2] **3,500**	
	8-10-inch high before jointing, cured in subdued light; Ohio; rat-growth method.										[2] 2,600	135
Rolled	England; bradycardia method			435–810								13
	Commercial sample; U. S. A.; rat-growth method			726								28

Whole grain	Commercial sample; U. S. A.; rat-growth method:											
	Raw			**600**								8
	Cooked				**[4] 630**							
	Fermentation method:											
	Anthony; obtained Minnesota			820								235
	Brunker C. I. No. 2054; obtained Kansas			600								
	Columbia C. I. No. 2820; obtained Kansas			750								
	Cornellian C. I. No. 1242; Idaho; obtained Washington, D. C.			520								
	Fulghum C. I. No. 708; Idaho; obtained Washington, D. C.			570								
	Fulton C. I. No. 3327; obtained Kansas			800								
	Gopher; obtained Minnesota			1,030								
	Huron; obtained Michigan			700								
	Iogold; obtained Michigan			600								
	Iogold; obtained Minnesota			970								
	Iowa 444; obtained Michigan			650								
	Iowa C. I. No. 847; Iowa; obtained Washington, D. C.			880								
	Kanota C. I. No. 839; obtained Kansas			820								
	Lenroc C. I. No. 3205; Idaho; obtained Washington, D. C.			500								
	Markton; obtained Michigan			600								
	Minrus; obtained Minnesota			1,000								
	Richland C. I. No. 787; Idaho; obtained Washington, D. C.			480								
	Rusota; obtained Minnesota			960								
	Silvermine C. I. No. 659; North Dakota; obtained Washington, D. C.			570								
	Wolverine; obtained Michigan			700								
	Worthy; obtained Michigan			600								
Oatmeal	Breakfast; England; thiochrome method			285								209
	England; bradycardia method			300–510								13
	Dry; [England]; bradycardia method			975								11
	Commercial sample; "quick-cooking"; U. S. A.; rat-growth methods.	Nil		810								29; 28
Okra	Long Green; garden fresh; Ohio; dye titration					14.7						34
	U. S. A.; rat-growth method			126								28
	Dwarf Green Prolific; Washington, D. C., market; cooked; U. S. A.; rat-growth method.		[4] 2,380									29
Oleomargarine	Vegetable; churned with milk; U. S. A.; rat-growth method.			6								268
Olive	Green, Spanish; bottled in New York; rat-growth method.	[2] ca 1,000										29
Oil	Rat-curative method							0				46

[1] International Unit values were calculated from carotene analyses or included carotene analyses.
[2] Values on cooked- or processed-weight basis.
[4] Values on raw-weight basis.

Vitamin values per 100 grams of edible portions of foods—Continued

Item (1)	Description of sample (2)	Vitamin A value (3a)	Vitamin A value (3b)	Thiamin (vitamin B$_1$) (4a)	Thiamin (vitamin B$_1$) (4b)	Ascorbic acid (vitamin C) (5a)	Ascorbic acid (vitamin C) (5b)	Vitamin D (6a)	Vitamin D (6b)	Riboflavin (7a)	Riboflavin (7b)	References (8)
		I. U.	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
Onion	Bermuda; average and range, 6 samples; Texas; dye titration.					7.3 4.5–9.9						85
	Bermuda; grown near Washington, D. C.; rat-growth method.	0										29
	Chinese; China; dye titration					37.2						41
	Sweet Spanish; Montana; rat-growth method and dye titration, respectively:											
	Raw					12.7						177
	Cut into sections and boiled 15 minutes						[2] 6.5					
	Stored 6 months			33		12.3						
	Stored 6 months, cut into sections and boiled 15 minutes.				[2] 39		[2] 8.5					
	Average and range; Argentina; dye titration					28 24–31						216
	Average, 2 batches; England; dye titration					7.4						200
	England; dye titration:											
	Raw; average, 1 batch					9.7						200
	After cooking; liquid discarded						[4] 5.6					
	After commercial canning, liquid discarded						[4] 8.9					
	Liquid from cooked sample						2.3					
	Liquid from canned sample						2.7					
	[England]; thiochrome method:											
	Raw			24								209
	Cooked				[2] 6							
	Stewed; England; bradycardia method				[2] 90–150							13
	Germany; dye titration:											
	Fresh					9.4						59
	Dried						[2] 32.0					
	do						[4] 4.97					
	Large variety; India; dye titration:											
	Raw					8.6						25
	Cooked						[2] 3.0					
	Medium variety; India; dye titration:											
	Raw					7.3						25
	Cooked						[2] 2.5					
	Small variety; India; dye titration:											
	Raw					6.6						25
	Cooked						[2] 1.9					
	Young and fresh; India; dye titration					10.5						1
	Stored; India; dye titration						Trace					1
	U. S. A.; fluorometric method									123		126
	Rumania; dye titration					5.5						204

	Brown; mature; U. S. A.; dye titration					14.4						34
	Winter; globe; U. S. A.; rat-growth method			>30								28
Dried	Germany; dye titration					32.0						59
	do					11.3						59
Scape	India; dye titration:											
	Raw					10.57						25
	Cooked						[2] 6.19					
Various parts	France; thiochrome and lumiflavin methods, respectively:											
	Scape (green)			15						5		83
	Bulb portion			10						15		
Orange (see Citrus fruit).												
Oyster	Woodfield; extra standard; Washington, D. C., market; rat-growth method.	210										29
	Whole, 94.6 percent moisture; Japan; lumiflavin method.									22.6		248
Frozen	Long Island; rat-growth and rat-curative methods, respectively:											
	Raw	300						5				281
	Cooked		[2] 230									
Palm nut oil	"Corrozo Negro"; Panama; cortex oil; rat-growth method.	15,800										27
	"Corrozo Gallinazo"; Panama; rat-growth method	4,800										27
Pancreas:												
Beef	U. S. A.; rat-growth and microbiological methods, respectively.			[7] 321						[7] 550		182;183
	U. S. A.; dye titration					14						196
	U. S. A.; microbiological method									[7] 610		183
	do									[7] 610		
Papaya	Semangka variety; Java; dye titration					33.9						244
	Ripe; average and range, 20 samples; Hawaii; dye titration.					73.6 36.9-115.7						184
	Hawaii; dye titration:											
	Very green, no yellow in flesh					*26.5*						184
	Green, slight yellow in flesh					*32.3*						
	Slightly green, flesh yellow but hard					*46.4*						
	Ripe, flesh yellow and soft					61.8						
	Hawaii; rat-growth methods	2,500		24								184
	Ripe; India; fluorometric method									18		291
	India; dye titration					48.1						1
	Java; dye titration					34.6						244
	do					43.4						244
	Juice from ripe fruit; India; dye titration					41.0						211
Various parts	India; dye titration:											
	Pulp					45.5						211
	Outer skin					71.0						
	[Japan]; modified dye titration:											
	Pulp					70						91
	Skin					116.5						

[2] Values on cooked- or processed-weight basis.

[4] Values on raw-weight basis.

[7] Values calculated from authors' data.

Vitamin values per 100 grams of edible portions of foods—Continued

Item (1)	Description of sample (2)	Vitamin A value (3a)	Vitamin A value (3b)	Thiamin (vitamin B_1) (4a)	Thiamin (vitamin B_1) (4b)	Ascorbic acid (vitamin C) (5a)	Ascorbic acid (vitamin C) (5b)	Vitamin D (6a)	Vitamin D (6b)	Riboflavin (7a)	Riboflavin (7b)	References (8)
		I. U.	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I.U.*	*I. U.*	*Mcg.*	*Mcg.*	
Paprika	Pods; Germany; dye titration:											
	Fresh					75.2						59
	Canned in tin						[4] 15.8					
	Pods; green; Rumania; dye titration					*160*						204
	Pods; red; Rumania; dye titration					270						204
	Pods; roasted; Rumania; dye titration						[2] 230					209
Paradise apple	"Djeroek Bali"; Java; dye titration					42.3						244
	"Djeroek padan"; Java; dye titration					25.3–29.6						244
Parsley	Paramount; garden fresh; Ohio; dye titration					109.4						34
	Zyklop; leaves only; Germany; modified dye titration.					262						32
	Average and range; Argentina; dye titration					178 160–200						216
	Germany; dye titration:											
	Fresh					262.0						59
	Dried						[2] 463.0					
	Dried						[4] 68.0					
	India; dye titration					280.8						211
	New York; dye titration					198						280
	U. S. A.; dye titration					176						22
Parsnip	Hollow Crown; garden fresh; Ohio; dye titration					32.6						34
	England; thiochrome method			114								209
	Washington, D. C., market; cooked; Maryland; rat-growth method.		Nil									29
	Local market sample; average and range; Montana; dye titration:											
	Tested in fall:											
	Raw, unpared					32.7 29.2–38.5						
	Boiled whole, unpared						[2] 28.4 [2] 24.4–36.8					
	Fried at once after boiling, unpared						[2] 31.7 [2] 28.7–37.5					
	Raw, unpared					23.1 18.7–32.1						
	Boiled, unpared and sliced						[2] 13.8 [2] 10.8–17.8					

	Fried at once after boiling, paring, and slicing.						[2] 21.0 [2] 14.4-28.1					176
	Tested in spring after being in ground all winter:											
	Raw, unpared					9.0 5.5-12.7						
	Whole, boiled, unpared						[2] 8.7 [2]4.6-13.4					
	Fried after boiling						[2] 10.2 [2]3.7-17.1					
	Raw, unpared					9.0 5.9-11.3						
	Boiled, pared, sliced						[2] 6.6 [2] 4.3-9.3					
	Fried at once after boiling, paring, and slicing.						[2] 9.7 [2]5.6-14.4					
	New York; dye titration:											
	Fresh; November 1937					40						280
	After 1-month storage in pit covered with solid top and straw mat.						21.6					
	After 4-month pit storage						16.5					
	After 5-month pit storage						14.9					
	After 3-month storage at 1°-3° C						20.4					
	After 5-month storage at 1°-3° C						12.9					
	After 3-month storage at 7° C						15.7					
	After 5-month storage at 7° C						10.3					
Various parts	Top end; average and range; local market sample; Montana; dye titration:											
	Autumn					28.3 20.1-36.6						176
	Spring					8.3 5.8-10.9						
	Tip end; average and range; local market sample; Montana; dye titration:											
	Autumn					35.7 29.3-40.5						
	Spring					9.7 4.8-15.8						
	Sliced lengthwise; average and range; local market sample; Montana; dye titration:											
	Autumn					22.2 18.7-32.1						
	Spring					9.0 5.9-11.3						

---

[2] Values on cooked- or processed-weight basis.
[4] Values on raw-weight basis.

Vitamin values per 100 grams of edible portions of foods—Continued

Item	Description of sample	Vitamin A value		Thiamin (vitamin B₁)		Ascorbic acid (vitamin C)		Vitamin D		Riboflavin		References
(1)	(2)	(3a)	(3b)	(4a)	(4b)	(5a)	(5b)	(6a)	(6b)	(7a)	(7b)	(8)
		I. U.	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
Passion fruit	Freshly picked; western Australia; dye titration					24						123
	Market sample; western Australia; dye titration					24						123
Paté de foie gras (See Liver, goose).												
Pawpaw	Fiji; dye titration					37.4						26
	Wild; freshly picked; Ohio; dye titration					36.0						34
	Freshly picked; western Australia; dye titration					98						123
Pea:												
Green	Alaska; New York; dye titration:											
	Immature					41						171
	Mature					*34*						
	Overmature					*29*						
	Alaska; small peas; New York; dye titration					34						171
	Alaska; U. S. A.; dye titration					43.4						75
	Alderman; New York; dye titration:											
	Raw					**24**						80
	Cooked 6 minutes						[2] **17**					
	Cooked 14 minutes						[2] **13**					
	Cooking liquid from 6-minute peas						[3] **6**					
	Cooking liquid from 14-minute peas						[3] **10**					
	Raw					**25**						80
	Cooked 15 minutes (just done)						[2] **15**					
	Cooked 19 minutes (overdone)						[2] **13**					
	Cooked 25 minutes (overdone)						[2] **13**					
	Cooking liquid from 15-minute peas						[3] **12**					
	Cooking liquid from 19-minute peas						[3] **16**					
	Cooking liquid from 25-minute peas						[3] **20**					
	Alderman; New York; dye titration:											
	Immature					29						171
	Mature					*24*						
	Overmature					*20*						
	Alderman; large; New York; dye titration					24						171
	Alderman's Telephone; average and range, 10 samples; dye titration.					39.7 33.9–46.7						75
	American Wonder; medium; New York; dye titration.					27						171
	California Telephone; market sample; U. S. A.; dye titration:											
	Raw					**21.4**						34
	Cooked, liquid discarded						[2] **12.2**					
	Cooked, liquid retained						[2] **16.8**					

Canning Queen; New York; dye titration:											
Immature					36						171
Mature					*29*						
Overmature					*19*						
Canning Queen; medium; New York; dye titration.					29						171
Dwarf Alderman; New York; dye titration:											
Immature					24						171
Mature					*21*						
Overmature					*17*						
Dwarf Alderman; large; New York; dye titration					21						171
Early Gilbo; large; New York; dye titration					25						171
Early Gilbo; New York; dye titration:											
Immature					29						171
Mature					*25*						
Foremost; medium; New York; dye titration					26						171
Gregory Surprise; small; New York; dye titration					28						171
Kelvedin Wonder; small; New York; dye titration.					32						171
Laxton's Progress; Washington, D. C., market sample; rat-growthmethod:											
Raw			450								8
Simmered 12 minutes				[4] 360							
Simmered 12 minutes with soda				[4] 300							
Laxtonian; Montana:											
Fresh; dye titration					27 16-40						218
Frozen; rat-growth methods		[2] 400		[2] 102							
Frozen and boiled 30 minutes; rat-growth methods.		[2] 860		[2] 85							
Boiled 30 minutes; dye titration						[2] 18 [2] 14-24					
Home-canned; dye titration						[2] 19 [2] 14-26					
Home-canned and reheated in juice 10 minutes; dye titration.						[2] 19 [2] 17-22					
Juice of home-canned; dye titration						[3] 22 [3] 17-25					
Home-canned, stored 6 months, and reheated in juice 10 minutes; rat-growth methods.		[2] 960		[2] 82							
Home-canned, stored 8 months; dye titration						[2] 19 [2] 16-23					
Home-canned, stored 8 months, and reheated in juice 10 minutes; dye titration.						[2] 18 [2] 13-26					
Juice of home-canned after canned product had been stored 8 months; dye titration.						[3] 24 [3] 20-29					
Home-canned, stored 11 months; dye titration.						[2] 17 [2] 15-18					
Home-canned, stored 11 months, and reheated in juice 10 minutes; dye titration.						[2] 20 [2] 17-25					
Juice of home-canned after canned product had been stored 11 months; dye titration.						[3] 23 [3] 20-25					

[2] Values on cooked- or processed-weight basis.

[3] Values per 100 ml.

[4] Values on raw-weight basis.

Vitamin values per 100 grams of edible portions of foods—Continued

Item	Description of sample	Vitamin A value		Thiamin (vitamin B₁)		Ascorbic acid (vitamin C)		Vitamin D		Riboflavin		References
(1)	(2)	(3a)	(3b)	(4a)	(4b)	(5a)	(5b)	(6a)	(6b)	(7a)	(7b)	(8)
		I. U.	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
Pea—Continued. Green—Con.	Little Marvel; garden fresh; Ohio; dye titration					102.8						34
	Mammoth Melting Sugar; New York; dye titration:											
	Immature					44						171
	Mature					*40*						
	Overmature					*29*						
	Meteor; medium; New York; dye titration					29						171
	Miracle; medium; New York; dye titration					25						171
	Onward; dye titration					30.1						75
	Perfection; New York; dye titration:											
	Size No. 6					**19.7**						171
	Size No. 5					**21.0**						
	Size No. 4					**25.9**						
	Size No. 3					**27.5**						
	Size No. 2					**34.6**						
	Perfection; New York; dye titration:											
	Immature					31						171
	Mature					*22*						
	Perfection; medium; New York; dye titration					22						171
	President Wilson; New York; dye titration:											
	Immature					33						171
	Mature					*21*						
	Overmature					*12*						
	President Wilson; large; New York; dye titration					21						171
	Stratagem; large; New York; dye titration					19						171
	Surprise; New York; dye titration:											
	Size No. 6					**20.8**						171
	Size No. 5					**22.0**						
	Size No. 4					**28.2**						
	Size No. 3					**27.4**						
	Size No. 2					**32.1**						
	Size No. 1					**32.2**						
	Surprise; New York; dye titration:											
	Immature					39						171
	Mature					*30*						
	Overmature					*18*						
	Surprise; small; New York; dye titration					30						171
	Thomas Laxton; Maine; rat-growth method:											
	Fresh			**399**								72
	Frozen after blanching 50 seconds at 100° C				[2] **390**							
	Processed 35 minutes at 115.5° C. in No. 2 cans after blanching 50 seconds at 100° C.				[2] **135**							
	Liquid from above cans				**177**							

Thomas Laxton; New York; spectrophotometric method:											
Before vining	[1]866										246
After vining		[1,4]816									
After blanching		[1,4]983									
After commercial freezing, all sizes		[1,4]783									
Graded No. 6, frozen		[1,4]750									
Thomas Laxton; New York; dye titration:											
Fresh					25						139
After vines were held on platform 18 hours at 17°–24° C.						24					
After pods were held in control chamber 20 hours at 6° C.						24					
After pods were held in control chamber 21 hours at 21° C.						25					
After pods were held in control chamber 18 hours at 32° C.						22					
Thomas Laxton; New York; dye titration:											
Raw					23						77
Cooked 16 minutes						[2]11					
Frozen						[2]17					
Frozen, cooked 8 minutes						[2]12					
Frozen and thawed						[2]17					
Frozen, thawed, cooked 8 minutes						[2]12					
Cooking liquid from 16-minute peas						[3]13					
Cooking liquid from frozen peas cooked 8 minutes.						[3]7					
Cooking liquid from frozen thawed peas, cooked 8 minutes.						[3]8					
Thomas Laxton; New York; dye titration:											
Immature					30						171
Mature					*26*						
Overmature					*20*						
Thomas Laxton; large; New York; dye titration					26						171
Thomas Laxton; New York; dye titration:											
Raw					23						80
Cooked 16 minutes (just done)						[2]11					
Cooked 20 minutes (overdone)						[2]12					
Cooking liquid from 16-minute peas						[3]13					
Cooking liquid from 20-minute peas						[3]18					
Raw					23						
Cooked 6 minutes						[3]11					
Cooked 16 minutes (done)						[2,3]8					
Cooking liquid from 6-minute peas						[3]7					
Cooking liquid from 16-minute peas						[3]11					

---

[1] International Unit values were calculated from carotene analyses or included carotene analyses.
[2] Values on cooked- or processed-weight basis.
[3] Values per 100 ml.
[4] Values on raw-weight basis.

Vitamin values per 100 grams of edible portions of foods—Continued

Item	Description of sample	Vitamin A value		Thiamin (vitamin B₁)		Ascorbic acid (vitamin C)		Vitamin D		Riboflavin		References
(1)	(2)	(3a)	(3b)	(4a)	(4b)	(5a)	(5b)	(6a)	(6b)	(7a)	(7b)	(8)
Pea—Continued. Green—Continued.	Thomas Laxton; New York; dye titration:	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
	Raw					**25**						76
	Frozen						**[2] 18**					
	Frosted, held in electric refrigerator 16 hours at 4.4° C.						**[2] 18**					
	Frosted, held 1 hour at 80° F.						**[2] 18**					
	Frosted, held 5 hours at 80° F.						**[2] 18**					
	Thomas Laxton; average and range, 22 samples; U. S. A.; dye titration.					43.4 27.5–47.8						75
	100-fold; U. S. A.; dye titration					21.7						75
	Boston market samples; spectrographic method	[1] 600–3,300										82
	California; dye titration:											
	Average, 54 samples; April–June					26						82
	Average, 86 samples; September–December					26						
	Range, 5 batches; England; dye titration:											
	Fresh					**19.7–31.2**						200
	After cooking, liquid discarded						**[4] 6.7–10.0**					
	After commercial canning, liquid discarded						**[4] 8.1–19.9**					
	Liquid from cooked samples						**4.2–7.4**					
	Liquid from canned samples						**11.0–17.8**					
	Average and range, 6 batches; England; dye titration.					24.8 19.7–31.2						200
	England; bradycardia method:											
	Raw			**480–840**								13
	Cooked				**[2] 240–360**							
	England; thiochrome method			360								209
	Cooked or canned; average and range; England; dye titration.						[2] 12 6–20					202
	France; thiochrome and lumiflavin methods, respectively.			100–200						30–50		83
	Germany; dye titration:											
	Fresh					**17.6**						59
	Blanched						**[4] 10.9**					
	Canned in tin						**[4] 5.6**					
	Canned in glass						**[4] 3.4**					
	Fresh					**13.2**						
	Blanched						**[4] 9.8**					
	Canned in tin						**[4] 9.2**					
	Germany; thiochrome method:											

Raw			219								164
Blanched and canned, liquid discarded				99							
Canned without blanching				120							
Liquid from blanched, canned product				96							
Liquid from canned product				129							
Germany; bradycardia method			249								164
India; dye titration					7.25						1
do					6.2						38
India; fluorometric method									280		195
do									10		291
Average, 33 samples; January–March; Mexico; dye titration.					28						82
New Jersey and New York areas; dye titration:											
Freshly picked; average and range, 45 samples					35.4 27.5–46.0						75
After shipping; (24–48 hours at 35° F.); average and range.					17.2 12.8–21.4						
After shipping, cooked tender in small amount of water; average and range, 8 samples.						[2]13.7 [2]11.0–17.8					
Frozen and shipped; average and range, 13 samples.						[2]13.1 9.3–15.6					
Frozen, shipped, and cooked; average and range, 8 samples.						[2]10.9 [2]5.8–13.9					
Canned; average and range, 13 samples						[2]5.7 [2]3.1–7.0					
Canned and reheated to 180° F.; average and range, 4 samples.						[2]5.2 [2]2.7–7.0					
New York; dye titration:											
Freshly vined					23						139
After washing						23					
After blanching						21					
Before shaker spray						22					
Before quality separator						21					
After quality separator						18					
Before picking belt						16					
After picking belt						16					
Before filling packages						16					
After packaging						16					
Fresh					25						
Blanched in Scott pipe type blancher, 60 seconds in water at 93° C.						21					
Blanched 85 seconds at 93° C						20					
Blanched 128 seconds at 93° C						17					
Blanched 153 seconds at 93° C						16					
Fresh					24						
Blanched in steam blancher 60 seconds at 100° C.						18					
Blanched 80 seconds at 100° C						17					
Blanched 100 seconds at 100° C						16					
Blanched 120 seconds at 100° C						16					
Blanched 180 seconds at 100° C						16					

---

[1] International Unit values were calculated from carotene analyses or included carotene analyses.

[2] Values on cooked- or processed-weight basis.

[4] Values on raw-weight basis.

Vitamin values per 100 grams of edible portions of foods—Continued

Item (1)	Description of sample (2)	Vitamin A value (3a)	(3b)	Thiamin (vitamin B_1) (4a)	(4b)	Ascorbic acid (vitamin C) (5a)	(5b)	Vitamin D (6a)	(6b)	Riboflavin (7a)	(7b)	References (8)
		I. U.	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
Pea—Continued. Green—Continued.	New York; dye titration—Continued.											
	Fresh					**25**						139
	Blanched in Scott blancher 60 seconds at 82° C						**21**					
	Blanched 60 seconds at 88° C						**20**					
	Blanched 60 seconds at 93° C						**21**					
	Blanched 130 seconds at 82° C						**21**					
	Blanched 156 seconds at 82° C						**18**					
	Blanched 90 seconds at 88° C						**20**					
	Blanched 122 seconds at 88°						**17**					
	Blanched 154 seconds at 88° C						**16**					
	Blanched 128 seconds at 93° C						**17**					
	Blanched 153 seconds at 93° C						**16**					
	Fresh					**25**						
	Blanched in Berlin-Chapman blancher 40 seconds at 100° C.						**18**					
	Blanched 60 seconds at 100° C						**17**					
	Fresh					**23**						
	Unblanched, frozen, stored 5 months at —4° C						**15**					
	Fresh					**21**						
	Blanched in water 60 seconds at 93° C., held 7 weeks at —4° C.						**4**					
	After vining; New York; dye titration:											
	Fresh					**28**						
	Held 3 hours at 4° C						**26**					
	Held 9½ hours at 4° C						**26**					
	Held 3 hours at 27° C						**24**					
	Average for 39 samples; Oregon and Washington; dye titration.					25						82
	Average and range, 18 varieties; U. S. A.; dye titration.					27 18–40						264
	U. S. A.; rat-growth method			390								28
	U. S. A.; fluorometric method									131		126
	do									154		126
	U. S. A.; dye titration					16						22
Canned	Thomas Laxton; Maine; rat-growth method:											
	Processed 35 minutes at 115.5° C. in No. 2 can after blanching 50 seconds at 100° C.			**135**								72
	Liquid from canned sample				**177**							
	Large, liquid discarded; England; dye titration:											
	Immediately after commercial canning					[4] **20.1**						200
	After 35-week storage at room temperature						[4] **12.0**					

	Medium-size, liquid discarded; England; dye titration:											
	Immediately after commercial canning					[4] 20.0						200
	After 35-week storage at room temperature						[4] 9.5					
	Small size, liquid discarded; England; dye titration:											
	Immediately after commercial canning					[4] 23.9						200
	After 35-week storage at room temperature						[4] 12.0					
	Germany; dye titration					3.3						161
	Commercially canned; Montana:											
	Stored 6 months, reheated in juice 10 minutes; rat-growth methods.		[2] 810		[2] 82							218
	Stored 8 months; dye titration						11 9–13					
	Stored 8 months, reheated in juice 10 minutes; dye titration.						[2] 12 [2] 11–13					
	Juice of peas that had been stored 8 months; dye titration.						[3] 14 [3] 13–15					
	Stored 11 months; dye titration						10 8–12					
	Stored 11 months, reheated in juice 10 minutes; dye titration.						[2] 10 [2] 8–11					
	Juice of peas that had been stored 11 months; dye titration.						[3] 13 [3] 12–14					
	U. S. A.; dye titration					5						22
	Commercial, strained; U. S. A.; dye titration:											
	1933 samples					9.0						108
	1934 samples					6.6						
	1935 samples					6.3						
	Commercial, strained; U. S. A.; rat-growth methods:											
	1932 sample	945										109
	1933 sample	1,145										
	1934 sample			86.1								
	Commercial samples, strained; U. S. A.; dye titration:											
	In tin containers; average, 2 samples					8.0						199
	In glass container; 1 sample					8.1						
Frozen	Alderman; blanched by scalding 1 minute at 88°–93° C., frozen and stored; Washington; rat-growth method.			670								8
	Asgrow 40; scalded 1 minute at 89° C., frozen pack; Washington; dye titration.					11.3						260
	Asgrow 40; blanched by scalding 1 minute at 88°–93° C., frozen and stored; Washington; rat-growth method.			740								81
	Confidence; blanched 1 minute at 88°–93° C., frozen and stored; Washington; rat-growth method.			430								81
	Duplex; scalded 1 minute at 88° C., frozen pack; Washington; dye titration.					19.3						260

---

[2] Values on cooked- or processed-weight basis.
[3] Values per 100 ml.
[4] Values on raw-weight basis.

Vitamin values per 100 grams of edible portions of foods—Continued

Item	Description of sample	Vitamin A value		Thiamin (vitamin B₁)		Ascorbic acid (vitamin C)		Vitamin D		Riboflavin		References
(1)	(2)	(3a)	(3b)	(4a)	(4b)	(5a)	(5b)	(6a)	(6b)	(7a)	(7b)	(8)
		I. U.	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
Pea—Continued. Green—Continued. Frozen—Con.	Dwarf Alderman; scalded 1 minute at 93° C., frozen pack; Washington; dye titration.					23.3						260
	Dwarf Alderman; 1937 crop, frozen pack stored at −15° C.; Washington; rat-growth method:											
	Raw	1,400										259
	Cooked		[4] 1,400									
	Extra Early Gradus; blanched 1 minute at 88°–93° C., frozen and stored; Washington; rat-growth method.			500								81
	Glacier Park; blanched 1 minute at 88°–93° C., frozen and stored; Washington; rat-growth method.			360								81
	Improved Gradus; scalded 1 minute at 91° C., frozen pack; Washington; dye titration.					29.4						260
	Laxton's Progress; scalded 1 minute at 92° C., frozen pack; Washington; dye titration.					14.5						260
	Laxton's Progress; blanched 1 minute at 88°–93° C., frozen and stored; Washington; rat-growth method.			200								81
	Laxtonian; scalded 1 minute at 93° C., frozen pack; Washington; dye titration.					19.7						260
	Rogers 95; scalded 1 minute at 89° C., frozen pack; Washington; dye titration.					16.0						260
	Rogers 95; blanched 1 minute at 88°–93° C., frozen and stored; Washington; rat-growth method.			650								81
	Stratagem; blanched 1 minute at 88°–93° C., frozen and stored; Washington; rat-growth method.			520								81
	Telephone; frozen pack; Washington; dye titration:											
	Thawed and analyzed immediately					17						260
	Thawed, allowed to stand 30 minutes at 25° C						14					
	Thawed, allowed to stand 1 hour at 25° C						12					
	Thawed, allowed to stand in refrigerator 24 hours at 4.5° C.						13					
	Telephone; frozen and stored; Washington; rat-growth and dye titration methods, respectively:											
	Blanched by scalding 1 minute at 99° C. in steam.	1,000		290		18.8						259; 81; 260
	Blanched by scalding 1 minute at 99° C. in hot water.	1,000		330		21.0						
	Blanched by scalding 2 minutes at 99° C. in hot water.	71,000		260		18.5						
	Blanched by scalding 3 minutes at 99° C. in hot water.			260		17.0						

Blanched by scalding 2 minutes at 88° C. in hot water.	>1,000		340		21.2						
Blanched by scalding 4 minutes at 88° C. in hot water.			270		23.2						
Blanched by scalding 6 minutes at 88° C. in hot water.	1,000		280		22.5						
Telephone; Washington; stored; rat-growth and dye titration methods, respectively:											
Blanched by scalding 2 minutes at 71° C. in hot water.			400		8.1						81; 260
Blanched by scalding 4 minutes at 71° C. in hot water.			310		7.2						
Blanched by scalding 6 minutes at 71° C. in hot water.			310		9.1						
Held 4 hours at room temperature before blanching by scalding 1 minute in hot water at 99° C.			300		16.1						
Held 8 hours at room temperature before blanching by scalding 1 minute at 99° C. in hot water.			290		20.6						
Thomas Laxton; frozen after blanching 50 seconds at 100° C.; Maine; rat-growth method.			390								72
Thomas Laxton; New York; photometric method:											
Graded size No. 6:											
No storage	[1] 766										246
Stored 9 months at 0° F.		[1] 666									
Stored 11 months at 0° F.		[1] 650									
No storage	[1]733										
Stored 9 months at −40° F.		[1] 733									
Stored 11 months at −40° F.		[1] 750									
Ungraded:											
No storage	[1] 783										
Stored 9 months at 0° C.		[1] 633									
Stored 11 months at 0° C.		[1] 683									
Thomas Laxton; New York; dye titration:											
Raw					17						76
Cooked 8 minutes (done)						[2] 10					
Drained liquid from cooked peas						[3] 7					
Thomas Laxton; New York; held 16 hours at 4.4° C.: dye titration:											
Raw					17						76
Cooked 8 minutes (done)						[3] 10					
Liquid from cooked peas						[3] 8					
World Record; blanched by scalding 1 minute at 88°–93° C., frozen and stored; Washington; rat-growth method.			710								81

---

[1] International Unit values were calculated from carotene analyses or included carotene analyses.
[2] Values on cooked- or processed-weight basis.
[3] Values per 100 ml.
[4] Values on raw-weight basis.

Vitamin values per 100 grams of edible portions of foods—Continued

Item	Description of sample	Vitamin A value		Thiamin (vitamin B₁)		Ascorbic acid (vitamin C)		Vitamin D		Riboflavin		References
(1)	(2)	(3a)	(3b)	(4a)	(4b)	(5a)	(5b)	(6a)	(6b)	(7a)	(7b)	(8)
Pea—Continued. Green—Continued. Frozen—Con.		*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
	Commercial; Boston market sample; spectrographic method.	[1] 4,800										82
	Commercial samples; Washington, D. C., market; rat-growth method:											
	Raw	**745**										29
	Cooked		[4] **647**									
	Commercial samples; U. S. A.; dye titration:											
	June, 47 samples					18						82
	July, 47 samples					17						146
	U. S. A.; dye titration					13.0						
Various parts	Mammoth Melting Sugar; New York; dye titration:											
	Whole pods					39						171
	Shelled peas					40						
	Telephone; held 4 hours at 21° C., blanched by scalding in water 1 minute at 99° C., frozen and stored; rat-growth method:											
	Cotyledon	1,000										259
	Skin	1,000										
	Range of 3 samples; England; dye titration:											
	Fresh green seeds					19.7–25.0						200
	Green pods					12.5–16.6						
	Country variety; India; dye titration.											
	Empty pods					20.3						211
	Seeds only					4.8						
	English variety; India; dye titration:											
	Empty pods					25.5						211
	Seeds only					9.2						
Dry	England; bradycardia method:											
	Raw			1,260–1,440								13
	Cooked				[2] 45–135							
	India; dye titration:											
	Dry seeds					**2.7**						1
	Sprouted						**9.1**					
	Green split peas; cooked; U. S. A.; rat-growth method.		[4] 530									29
Peach	Elberta; Washington, D. C., market during August and September; Maryland; rat-growth method.	1,670										29

	Elberta; average and range, 3 samples; Texas; dye titration.					2.2 1.5–3.5						85
	Elberta; U. S. A.; dye titration					8.4						34
	Elberta; freshly picked; western Australia; dye titration.					17						123
	Fall Yellow Clearseed; Texas; dye titration					12.9 10.9–14.8						85
	Green Cling; Texas; dye titration					15.0						85
	Italian Peach; Germany; dye titration:											
	Fresh					4.0						59
	Blanched						[4]0.7					
	Canned in tin						[4]0.9					
	Muir, California	625–1,000										189
	White Clearseed; Texas; dye titration					7.4 7–7.8						85
	Yellow Cling; Texas; dye titration					13.3						85
	Yellow; Boston market sample; spectrographic method.	[1]300–3,000										82
	Flat; China; dye titration					4.10						41
	China; dye titration					2.90						41
	Green; France; thiochrome and lumiflavin methods, respectively.			20						7		83
	Average and range, 27 varieties; Germany; dye titration.					2.2 1.3–7.1						229
	India; dye titration					1.0						1
	Rumania; dye titration					5.75						204
	White fleshed; U. S. A.; rat-growth method			<25								28
	U. S. A.; fluorometric method									64		126
	An early variety; market sample; western Australia; dye titration.					1						123
	Ripe; bradycardia method			30–120								13
	Thiochrome method			18								209
Canned	Commercial samples; average and range, 3 samples; U. S. A.; dye titration:											
	In tin containers					3.8 1.8–4.8						199
	In glass containers					3 1–4						
	Bradycardia method:											
	Fruit			30–90								13
	Juice				Trace							
Dried	Yellow; sulfured, tenderized; California; rat-growth method.	3,400										29
Frozen	Yellow; Boston market; commercial sample; spectrographic method.	[1]2,000										82
Juice	U. S. A.; dye titration					[3]1.8						102
Kernel	Fresh; China; dye titration					15.0						41

---

[1] International Unit values were calculated from carotene analyses or included carotene analyses.

[2] Values on cooked- or processed-weight basis.

[3] Values per 100 ml.

[4] Values on raw-weight basis.

Vitamin values per 100 grams of edible portions of foods—Continued

Item (1)	Description of sample (2)	Vitamin A value (3a)	(3b)	Thiamin (vitamin B$_1$) (4a)	(4b)	Ascorbic acid (vitamin C) (5a)	(5b)	Vitamin D (6a)	(6b)	Riboflavin (7a)	(7b)	References (8)
		I. U.	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
Peanut	Spanish; red skins included; rat-growth method:											
	Raw			1,300								(6)
	Cooked in coconut oil 12–14 minutes at 177° C.				[2] 375							
	Spanish; without skins; rat-growth method:											
	Raw			1,050								28
	Roasted 20 minutes at 190° C.				[2] 230							
	Spanish; without skins, roasted 20 minutes at 190° C.; rat-growth method.	Nil										29
	Virginia; extra-large, without skins; rat-growth method:											
	Raw			900								(6)
	Roasted 9 minutes at 224°–227° C., and cooked 12–14 minutes in coconut oil at 149° C., salted.				[2] 150							
	Mixture of 60 percent No. 1 Virginia and 40 percent No. 1 Spanish; rat-growth method:											
	Raw			1,360								(6)
	Roasted 9 minutes at 249° C., ground into butter, salted.				[2] 270							
	China; dye titration					9.8						41
	"Ground nut;" India; fluorometric method									376		195
	Java; rat-growth method	5–47										98
	Raw; one sample; U. S. A.:											
	Fluorometric method									450		250
	Rat-growth method									470		
	Roasted and salted; U. S. A.; dye titration						0					43
	Thiochrome method			684								209
Various parts	Virginia; raw; rat-growth method:											
	Whole peanut without skins			750								28
	Germ portion				882							
	Red skins				7,896							
Peanut butter	Commercial sample; rat-growth method			201								(6)
	do			267								(6)
Pear	Bartlett; Washington, D. C., market; California; rat-growth method.	<50										29
	Bartlett; dye titration					2.58						41
	Garber; average and range, 3 samples; Texas; dye titration.					2.3 1.8–3.2						85
	Kieffer; freshly picked; Ohio; dye titration					6.7						34
	Kieffer; average and range, 3 samples; Texas; dye titration.					2.5 2.1–3.1						85

	Average and range; Argentina; dye titration					10 9-11						216
	China; dye titration					11.0						41
	Chinese: China; dye titration					3.20						41
	Fresh; average, 3 batches; England; dye titration					4.4						200
	France; thiochrome and lumiflavin methods, respectively.			20						7		83
	India; dye titration					<1.0						1
	India; fluorometric method									30		291
	Rumania; dye titration					4.5						204
	U. S. A.; rat-growth method									19.8		157
	do			<25								28
	U. S. A.; fluorometric method									76		126
	Thiochrome method			54								209
	Average and range; dye titration					3 2-3						202
Canned	Bartlett; commercial samples; average and range, 4 samples; U. S. A.; dye titration:											--
	In tin containers					1.6 0-4						199
	In glass containers					1.5 0.8-2.5						
	U. S. A.; dye titration:											
	Solids					2.0						43
	Liquid from above samples						[3] 1.4					
Juice	Pears grown with various exposures on trees and different trees in same orchard; Japan; dye titration:											
	Yamashiro pear					0.29-1.18						185
	Twentieth century pear					0.46-0.78						
	Japan; dye titration:											
	Pears grown on sunny side of trees					0.29						185
	Pears grown on shady side of trees					0.23						
Various parts	England; dye titration:											
	Cortex portion					3.1						200
	Peel					6.6						
	India; dye titration:											
	Flesh					1.6						225
	Skin					7.2						
Pecan	Unblanched; Texas; rat-growth method	ca 200										29
Pepper:												
Mild	Neapolitan; green; ripe; Texas; dye titration					164.4 131.4- 197.3						85
	Neapolitan; red ripe; Texas; dye titration					228.3 177.5- 279.						85

---

[2] Values on cooked or processed-weight basis.
[3] Values per 100 ml.
[6] Unpublished data, Bureau of Home Economics.

Vitamin values per 100 grams of edible portions of foods—Continued

Item	Description of sample	Vitamin A value		Thiamin (vitamin B_1)		Ascorbic acid (vitamin C)		Vitamin D		Riboflavin		References
(1)	(2)	(3a)	(3b)	(4a)	(4b)	(5a)	(5b)	(6a)	(6b)	(7a)	(7b)	(8)
		I. U.	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
Pepper—Continued. Mild—Continued.	Ruby King; red ripe; Texas; dye titration					281						85
	Sunnybrook; ripe, garden fresh; Ohio; dye titration					238.3						34
	Windsor A; green, garden fresh; Ohio; dye titration					97.6						34
	Wonder variety; green; Washington, D. C., market; California; rat-growth method:											
	Raw	[5] 875										29
	Cooked		**[4] 1,100**									
	Sweet; Boston market sample; spectrographic method.	[1] 800– 7,700										
	Green; Washington. D. C., market sample; rat-growth method.			60								(6)
Pungent	Florida (Floral Gem?); green ripe; Texas; dye titration.					128.5						85
	Florida (Floral Gem?); red ripe; Texas; dye titration					195.6						85
	Hungarian Dox (Hungarian Wax?); green ripe; Texas; dye titration.					140.1						85
	Hungarian Dox (Hungarian Wax?); red ripe; Texas; dye titration.					252.8						85
	Hungarian Wax; U. S. A.; dye titration *See also* Chili.					127.2						34
Unclassified	Green; average and range; Argentina; dye titration					74 70–78						216
	Small, blunt, green pod; Texas; dye titration					104.4						85
	Small, slender, green pod; Texas; dye titration					140						85
	Green; U. S. A.; fluorometric method									138		126
	Green; U. S. A.; dye titration					20.1						196
	do					180						22
	Juice, from green pepper; U. S. A.; dye titration					[3] 20.3						102
	Red; average and range; Argentina; dye titration					245 227–264						216
	Red; unripe; India; dye titration					45.5						1
	Red; India; dye titration					34.0						1
	do					11.7						1
	Red; large; India; dye titration					55.6						1
	Red; ripe; U. S. A.; dye titration					230						22
	India; fluorometric method									15,200		195
Perch	Red; fresh; Germany; chromatographic and colorimetric method.									69.6		233
Persimmon	Solid Gold Hachiya; Washington, D. C., market; California; rat-growth method.	2,550										29

	Average and range, 3 samples; Texas; dye titration					43. 1 32. 4–53						85
Juice	Japan; dye titration:											
	Fruit grown with various exposures on tree and on different trees in same orchard.					32. 8–53. 9						185
	Fuyu variety; grown on different branches of one tree.					48. 8–55. 1						
	Fuyu variety; grown on different branches of a second tree.					41. 1–49. 8						
Various parts	India; dye titration:											
	Pulp					6. 1						211
	Outer skin					Nil						
Pickle	Gherkin: [England]; thiochrome method			Nil								209
	Sweet; [England]; thiochrome method			Nil								209
	Onion; [England]; thiochrome method			Nil								209
	Walnut; [England]; thiochrome method			Nil								209
	Green mango; very tender ones preserved in salt; India; dye titration.					176. 5						211
	Dried mango; salted; India; dye titration					*2. 6*						211
Pigeon	Flesh; China; dye titration					9. 22						41
Various organs (see Liver).												
Pine:												
Seeds	Dried; China; dye titration					2. 43						41
Pineapple	Sugar loaf; Washington, D. C., market; Florida; rat-growth method.	ca 200										29
	Average and range; Argentina; dye titration					43 25–60						216
	Boston market sample; spectrographic method	[1] 100										82
	India; dye titration					62. 9						211
	do					28. 5						1
	Freshly picked; western Australia; dye titration					19						123
	Rat-growth method			90								28
	Thiochrome method			30								210
	Canned; thiochrome method				[2] 30							209
	Grated; frozen; Boston market sample; spectrographic method.		[1] 55									82
Juice	Fiji; dye titration					55. 4						26
	India; dye titration					75. 9						211
	Fresh; dye titration					[3] 31. 0						102
Canned	Commercially canned; average and range, 3 brands; 2–12-month storage; dye titration.					[3] 14 [3] 10–18						3
	Dye titration					[3] 7. 0						102

---

[1] International Unit values were calculated from carotene analyses or included carotene analyses.
[2] Values on cooked- or processed-weight basis.
[3] Values per 100 ml.
[4] Values on raw-weight basis.
[5] This figure may be significantly affected by method of sampling because of oxidative enzymes.
[6] Unpublished data, Bureau of Home Economics.

Vitamin values per 100 grams of edible portions of foods—Continued

Item (1)	Description of sample (2)	Vitamin A value (3a)	 (3b)	Thiamin (vitamin B$_1$) (4a)	 (4b)	Ascorbic acid (vitamin C) (5a)	 (5b)	Vitamin D (6a)	 (6b)	Riboflavin (7a)	 (7b)	Reference (8)
Plantain:		*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
Various parts	Freshly picked; western Australia; dye titration					11						123
	Rajan variety; ripe; India; dye titration:											
	Flesh					Trace						211
	Peel from above fruit					Nil						
	Rasthali variety; ripe; India; dye titration:											
	Flesh					Trace						211
	Peel from above fruit					Nil						
	Common variety; India; dye titration:											
	Flesh					5.5						211
	Peel from above fruit					Nil						
	Hill variety; ripe; India; dye titration:											
	Flesh					8.5						211
	Peel from above fruit					Nil						
	Red variety; ripe; India; dye titration:											
	Flesh					Trace						211
	Peel from above fruit					Nil						
	India; dye titration:											
	Flesh					45.1						225
	Peel from above fruit					48.6						
	Unripe, used as a vegetable; India; dye titration:											
	Flesh					23.9						211
	Peel from above fruit					Nil						
Plum	Damson; [England]; thiochrome method			114								209
	Damson; skin removed; U. S. A.; rat-growth; method.			48								28
	Golden Plum; [England]; dye titration:											
	Fresh					1						202
	Made into jam						[2] 1					
	Greengage; average, 2 batches; England; dye titration:											
	Raw					5.8						200
	Cooked in sirup, liquid included						[4] 2.4					
	Commercially canned in sirup, liquid included						[4] 7.4					
	Greengage; [England]; dye titration:											
	Fresh					3						202
	Made into jam						[2] 1					
	Greengage; cooked or canned; average and range; [England]; dye titration.						[2] 2 [2] 1–4					202
	Greengage; [England]; thiochrome method			198								209
	Greengage; average and range, 9 batches; England; dye titration.					<4.7 <1.0–6.9						200

	Greengage; India; dye titration					<0.5							1
	President; Washington, D. C., market; California; rat-growth method.	360											29
	Satsuma; freshly picked; western Australia; dye titration.					3							123
	do					7							123
	China; dye titration					0							41
	Fresh; average and range, 10 batches; England; dye titration.					<4.6 <1.0–4.6							200
	[England]; bradycardia method			120									11
	Cooked or canned; average and range; [England]; dye titration.						[2] 1 [2] 1–4						202
	Average and range, 5 varieties; Germany; dye titration.					4.6 2.9–6.7							229
	Fresh; Germany; modified dye titration					16							32
	Germany; dye titration:												
	Fresh					5.9							59
	Canned in tin						[4] 5.1						
	Canned in glass						[4] 5.5						
	Yellow; India; dye titration					<0.5							1
	India; dye titration					40.7							38
	do					53.8							38
	Rumania; dye titration					5.5							204
	Large, yellow; average and range, 4 samples; Texas; dye titration.					2.4 2–2.7							85
	Small, pink; average and range, 4 samples; Texas; dye titration.					6.7 3.5–10.7							85
	Wild red; Texas; dye titration					8.4							85
Juice	Fresh; U. S. A.; dye titration					[3] 3.0							102
Various parts	India; dye titration:												
	Flesh					33.7							225
	Skin					320							
	India; dye titration:												
	Flesh					47.0							225
	Skin					400							
Pokeweed	Ohio; dye titration					273.5							35
Pollen	Mixed type from Bureau of Plant Industry, Washington, D. C.; rat-growth method.	ca 2,000–3,000		1,500									(6)
Pomegranate	Texas; dye titration					6.0							85
	Juice; India; fluorometric method										[3] 100		291
	Juice; India; dye titration					15.6							1
Popcorn (see Corn).													

---

[2] Values on cooked- or processed-weight basis.
[3] Values per 100 ml.
[4] Values on raw-weight basis.
(6) Unpublished data, Bureau of Home Economics.

Vitamin values per 100 grams of edible portions of foods—Continued

Item (1)	Description of sample (2)	Vitamin A value (3a)	Vitamin A value (3b)	Thiamin (vitamin B$_1$) (4a)	Thiamin (vitamin B$_1$) (4b)	Ascorbic acid (vitamin C) (5a)	Ascorbic acid (vitamin C) (5b)	Vitamin D (6a)	Vitamin D (6b)	Riboflavin (7a)	Riboflavin (7b)	References (8)
		I. U.	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
Pork	Chops, raw, lean loin; Washington, D. C., market; rat-growth method.	Nil										29
	Chops, raw, lean loin; rat-growth method			1,365								28
	Chops, lean loin; Washington, D. C., market; rat-growth method:											
	Raw			1,455								8
	Braised				[4]1,239							
	do				[2]1,650							
	Ham, lean; U. S. A.; rat-growth and microbiological methods, respectively.			3,000						270		182;183
	Ham, lean; 2 samples; U. S. A.; microbiological method.									200 220		183
	Ham, lean; U. S. A.; rat-growth and microbiological methods, respectively:											
	Raw			[7]1,530								182
	Fried				[4,7]1,530						[7]230	182;183
	Ham, lean; U. S. A.; microbiological method:											
	Raw									220		183
	Boiled										[4]280	
	Ham, lean, baked; composite of 5 samples; Washington, D. C., market; rat-growth method.				[2]660							(6)
	Loin, lean; Washington, D. C., market; rat-growth method:											
	Raw			1,365								8
	Roasted at 175° C. until interior reached 84° C.				[4]780							
	do				[2]1,200							
	Loin lean; U. S. A.; rat-growth method			3,900								182
	Loin; range, 5 samples; U. S. A.; microbiological method.									230–270		183
	Loin, lean; U. S. A.; rat-growth and microbiological methods, respectively:											
	Raw			[7]1,830						200		182;183
	Baked				[4,7]915						[4,7]91.5	
	Fried				[4,7]1,190						[4,7]183.0	
	Roasted				[4,7]915							182
	Loin, lean; U. S. A.; microbiological method:											
	Raw									270		183
	Fried										[4,7]122	
	Roasted										[4,7]107	
	Loin, lean; Washington, D. C., market; rat-growth method:											

	Raw			1,770								(6)
	Preheated, processed in cans 85 minutes at 15 pounds pressure.				[4] 240							
	do				[2] 348							
	Lean flesh; Germany; chromatographic and colorimetric method.									87.6–91.4		233
	Rumania; dye titration					1.90						204
	Thiochrome method			1,425								209
	Lean, roasted; bradycardia method				[2] 960							11
Canned	Ham; commercial samples; U. S. A.; rat-growth and microbiological methods, respectively.			814						220		182;183
	Ground lean pork shoulder mixed with 5–10 percent lean fresh ham, salt, sugar, pepper, sodium nitrate added; commercially packed and processed in 12-ounce tins; U. S. A.; rat-growth method.			410								(6)
	Ground lean pork, salt, sugar, pepper, and sodium nitrate added; commercially packed and processed in 12-ounce tins; U. S. A.; rat-growth method.			536								(6)
Cured	Smoked ham; commercial sample; U. S. A.; rat-growth and microbiological methods, respectively:											
	Raw			[7] 1,072						290		182;183
	Fried				[4] [7] 942						[4] 260	
	Smoked ham; 2 commercial samples; U. S. A.; microbiological method.									230 240		183
	Ham; thiochrome method			720								207
	Ham, lean, ½-inch slice; U. S. A.; rat-growth method:											
	Raw			1,485								(6)
	Fried				[2] 1,680							(6)
	Fried				[4] 1,395							
	Ham, lean, boiled; bradycardia method				[2] 660							11
	Ham, lean; U. S. A.; rat-growth method			1,428								28
	Salt pork; Washington, D. C., market; rat-growth method.	Nil										29
	Ham, cooked; [England]; thiochrome method				[2] 570							209
Various organs (see Heart, Kidney, Liver, etc.).												
Sausage	Thiochrome method			48								209
See also bacon.	Smoked; thiochrome method				[2] 258							209
Potato	Arran Banner; Scotland; dye titration:											
	Harvested July 26					20						241
	Harvested Aug. 31					34						
	Harvested Sept. 14					22						

---

[2] Values on cooked- or processed-weight basis.
[4] Values on raw-weight basis.
[6] Unpublished data, Bureau of Home Economics.
[7] Values calculated from authors' data.

Vitamin values per 100 grams of edible portions of foods—Continued

Item (1)	Description of sample (2)	Vitamin A value (3a)	Vitamin A value (3b)	Thiamin (vitamin B_1) (4a)	Thiamin (vitamin B_1) (4b)	Ascorbic acid (vitamin C) (5a)	Ascorbic acid (vitamin C) (5b)	Vitamin D (6a)	Vitamin D (6b)	Riboflavin (7a)	Riboflavin (7b)	References (8)
		I. U.	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
Potato—Continued.	Arran Consul; Scotland; dye titration:											
	Stored 1 month at 2°-8° C.; (from healthy plants).					19.3						241
	Stored 1 month at 2°-8° C.; (from plants infected with mosaic).						*21.0*					
	Stored 4 months at 2°-8° C.; (from healthy plants).					8.8						
	Stored 4 months at 2°-8° C.; (from plants infected with mosaic).						*7.1*					
	Arran Pilot; Scotland; dye titration:											
	Harvested July 4					27						241
	Harvested July 26					14						
	Harvested Aug. 31					30						
	Harvested Sept. 14					17						
	Bintjes; pared; Holland; thiochrome method:											
	Raw			54								288
	Cooked				[2] 46							
	Blauwpitten; pared, cooked; Holland; thiochrome method.				[2] 42							288
	Bliss Triumph; Montana; dye titration:											
	New, raw					12.6						178
	Cut crosswise and boiled 35 minutes at 95° C						[2] 14.9					
	Steamed 45 minutes						[2] 17.2					
	Cooked at 17½ pounds steam pressure for 5-8 minutes.						[2] 12.2					
	Baked 1 hour at 225° C						[2] 22.0					
	Fried in butter 20 minutes						[2] 13.4					
	Cooked and fried in butter 10 minutes, held 24 hours at 4.4° C.						[2] 6.8					
	Mashed after boiling 35 minutes						[2] 14.6					
	Escalloped (baked 70 minutes at 176.7° C)						[2] 12.0					
	Stored 6 months at 37.6°-45.9° F. and 81.4-94.4 percent relative humidity.					9.1						
	Stored, cooked 35 minutes at 95° C						[2] 10.5					
	Stored, steamed 45 minutes						[2] 11.1					
	Stored, cooked at 17½ pounds steam pressure for 5-8 minutes.						[2] 8.2					
	Stored, baked 1 hour at 225° C						[2] 12.7					
	Stored, fried in butter 20 minutes						[2] 9.1					
	Stored, fried in crisco 20 minutes						[2] 10.7					
	Stored, cooked, held 24 hours at 4.4° C., and fried in butter 10 minutes.						[2] 7.1					
	Stored, mashed after boiling 35 minutes						[2] 9.3					

Stored, escalloped (baked 70 minutes at 176.7° C.)						[2] 7.9					
Stored 6 months at 55°-60° F., and 42.2-56.9 percent relative humidity.					10.6						
Stored 6 months at 55°-60° F., and 42.2-56.9 percent relative humidity; cooked 35 minutes at 95° C.						[2] 12.2					
Chippewa; 12 weeks after planting; Maryland; dye titration.					25.5						224
Chippewa; 13 weeks after planting; Maryland; dye titration:											
Fresh					26.4						224
Stored 1 week at 25.5° C					20.6						
Stored 2 weeks at 25.5° C					19.2						
Stored 3 weeks at 25.5° C					17.0						
Chippewa; 14 weeks after planting; Maryland; dye titration:											
Fresh					25.9						224
Stored 2 weeks at 25.5° C					17.8						
Stored 3 weeks at 25.5° C					17.0						
Chippewa; dye titration:											
Grown in Massachusetts					9.9						166
Grown in New York					9.6						
Average of above samples, 8 tubers each					9.7						
Chippewa; average, 8 tubers; dye titration:											
Raw					18.1						166
Baked						[2] 9.6					
Boiled in skins						[2] 8.6					
Chippewa; dye titration:											
Baked						[2] 8.0					166
Stored 5 months, baked						[2] 4.3					
Pared, boiled						[2] 8.0					
Stored 5 months, pared, boiled						[2] 3.5					
Sliced, boiled						[2] 6.8					
Stored 5 months, sliced, boiled						[2] 2.5					
Dunbar Cavalier; Scotland; dye titration:											
Harvested July 26					21						241
Harvested Aug. 31					24						
Harvested Sept. 14					14						
Dunbar Cavalier; Scotland; dye titration:											
Stored 1 month at 2°-8° C.; (from healthy plants).					17.2						241
Stored 1 month at 2°-8° C.; (from plants infected with mosaic).						*26.5*					
Stored 4 months at 2°-8° C.; (from healthy plants).					7.9						
Stored 4 months at 2°-8° C.; (from plants infected with mosaic).						*8.0*					
Early Ohio; U. S. A.; dye titration					28.2						34

---

[2] Values on cooked- or processed-weight basis.

Vitamin values per 100 grams of edible portions of foods—Continued

Item	Description of sample	Vitamin A value		Thiamin (vitamin B$_1$)		Ascorbic acid (vitamin C)		Vitamin D		Riboflavin		References
(1)	(2)	(3a)	(3b)	(4a)	(4b)	(5a)	(5b)	(6a)	(6b)	(7a)	(7b)	(8)
Potato—Continued.	Edelragis; Germany; dye titration:											
	Early March:	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
	Raw					16.3						271
	Pared, boiled 15 minutes in salt water						16.3					
	Pared, boiled 5 minutes, then kept at cooking heat for 1 hour.						9.8					
	Pared, boiled 5 minutes, then kept at cooking heat for 3½–4 hours.						6.1					
	April:											
	Raw					13.85						
	Pared, boiled immediately						10.9					
	Unpared, boiled						11.8					
	Epicure; [England]; thiochrome method			87								210
	Erdgold; Germany; dye titration:											
	Raw					6.6						230
	Unpared, steamed						6.2					
	Pared, steamed						6.4					
	Pared, boiled						5.9					
	Erdgold; range, samples from 4 places; Germany; dye titration:											
	Large					5.3–8.3						230
	Small					5.6–7.8						
	Erstlinge; September; Germany; dye titration:											
	Raw					23.5						271
	Pared, boiled immediately						18.9					
	Unpared, steamed						23.5					
	Flava; Germany; dye titration:											
	Raw					8.2						230
	Unpared, steamed						7.4					
	Pared, steamed						6.7					
	Pared, boiled						5.9					
	Flava; range, samples from 4 places; Germany; dye titration:											
	Large					6.2–8.5						230
	Small					5.8–9.5						
	Golden; average, 8 tubers; dye titration:											
	Raw					13.1						166
	Baked						[2] 6.1					
	Boiled in skins						[2] 6.1					
	Golden; dye titration:											
	Baked						[2] 5.9					166
	Stored 5 months, baked						[2] 3.6					
	Pared, boiled						[2] 4.2					
	Stored 5 months, pared, boiled						[2] 3.6					

Sliced, boiled						[2] **4.2**					
Stored 5 months, sliced, boiled						[2] **2.5**					
Golden Wonder; Scotland; dye titration:											
Stored 1 month at 2°-8°C.; (from healthy plants).					**20.0**						241
Stored 1 month at 2°-8°C.; (from plants infected with mosaic.)						*17.5*					
Stored 4 months at 2°-8°C.; (from healthy plants.)					**11.5**						
Stored 4 months at 2°-8°C.; (from plants infected with mosaic.)						*9.8*					
Great Scott; [England]; thiochrome method			75								231
Great Scot; Scotland; dye titration:											
Harvested July 4					17						241
Harvested July 26					25						
Harvested Aug. 31					26						
Harvested Sept. 14					18						
Green Mountain; Maine; dye titration:											
Stored 5 months at 15.5°C					**10.1**						224
Stored 6 weeks at 15.5°C., then for 19 weeks at 4.5°C.					**7.5**						
Green Mountain; Maine market sample; baked 35 minutes at 400° C.; dye titration.						[2] 14.5					43
Green Mountain; dye titration:											
Grown in Massachusetts					13.2						166
Grown in California					10.7						
Grown in Maine					9.5						
Grown in New York					13.6						
Average for above samples, 8 tubers each					11.7						
Green Mountain; Massachusetts; dye titration:											
No fertilizer added to soil					7.7						166
Soil fertilized with various chemicals					7.4-8.8						
Green Mountain; "new" marketable; Massachusetts; dye titration:											
Harvested Aug. 20					17.2						166
Harvested Aug. 27					16.2						
Harvested Sept. 4					11.8						
Harvested Sept. 10					17.7						
Harvested Sept. 19					13.2						
Harvested Sept. 28					13.2						
Harvested Oct. 3, fully mature					17.5						
Left in ground until Nov. 22					*14.1*						
Green Mountain; dye titration:											
Raw, whole					**12.1**						166
Pared, cut in halves, boiled in water						[2] **4.5**					
Pared, cut in halves, boiled in salt water						[2] **5.2**					
Mashed, salted						[2] **4.6**					
Mashed, unsalted						[2] **3.1**					

---

[2] Values on cooked- or processed-weight basis.

amin values per 100 grams of edible portions of foods—Continued

Item (1)	Description of sample (2)	Vitamin A value (3a)	Vitamin A value (3b)	Thiamin (vitamin B_1) (4a)	Thiamin (vitamin B_1) (4b)	Ascorbic acid (vitamin C) (5a)	Ascorbic acid (vitamin C) (5b)	Vitamin D (6a)	Vitamin D (6b)	Riboflavin (7a)	Riboflavin (7b)	References (8)
		I. U	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
Potato—Continued.	Green Mountain; U. S. A.; dye titration:											
	New, raw					20.0						224
	Pared, boiled						[4] 16.1					
	Cooking liquor from above (per 100 gm. raw potato).						2.3					
	Green Mountain; U. S. A.; dye titration:											
	New, raw					17.3						224
	Pared, cooked in "waterless" cooker						[4] 15.8					
	Green Mountain; new; U. S. A.; dye titration:											
	As purchased on market					20.0						224
	After storage 10 days at 25.5°C					17.3						
	Green Mountain; U. S. A.; dye titration:											
	New					25						256
	After exposure to 30–60 percent carbon dioxide at 25°C. for 15 days.						15–21					
	Green Mountain; U. S. A.; dye titration:											
	Baked						[2] 9.3					166
	Stored 5 months, baked						[2] 5.7					
	Pared, boiled						[2] 8.5					
	Stored 5 months, pared, boiled						[2] 5.1					
	Sliced, boiled						[2] 5.1					
	Stored, sliced, boiled						[2] 4.6					
	Green Mountain; average, 8 tubers; U. S. A.; dye titration:											
	Raw					13.2						166
	Baked						[2] 6.9					
	Boiled in skin						[2] 11.3					
	Green Mountain; new; U. S. A.; dye titration					19.1						21
	Green Mountain; stored 10 months; U. S. A.; dye titration.					8.3						21
	Green Mountain; Washington, D. C., market sample; dye titration:											
	Raw					10						(6)
	Made into chips						[2] 13.9					
	do						[4] 4.6					
	Raw					10.5						
	Made into chips						[2] 17.1					
	do						[4] 6.2					
	Made into chips and stored 1 week at room temperature.						[2] 15.9					
	Made into chips and stored 1 week at room temperature.						[4] 5.7					

Houma; average, 8 tubers; dye titration:											
Raw					25.0						166
Baked						[2] 8.5					
Boiled in skins						[2] 16.5					
Idaho; baked; U. S. A.; dye titration:											
Immediately after baking						[2] 9.6					31
Skin opened and let stand 30 minutes						[2] 4.2					
Industrie; middle of April; Germany; dye titration:											
Raw					10.4						271
Pared, boiled 15 minutes in salted water						7.8					
Irish Cobbler; Kentucky; dye titration:											
Raw					20.0						166
Boiled in skins						[2] 6.3					
Boiled, stored 24 hours at 40° F						[2] 5.2					
Creamed						[2] 2.4					
Boiled, home-fried						[2] 4.9					
Irish Cobbler; Maine; dye titration:											
Stored 5 months at 15.5° C					9.9						224
Stored 6 weeks at 15.5° C., then for 19 weeks at 4.5° C.					5.9						
Irish Cobbler; October; Maine; rat-growth method:											
Raw	ca 40										29
Cooked		[4] ca 40									
Irish Cobbler; stored at 15.5° C.; Maine; dye titration:											
Raw					10.6						224
Baked						[4] 9.0					
Raw					10.1						224
Unpared, steamed						[4] 9.1					
Unpared, boiled						[4] 9.1					
Raw					9.7						
Pared, steamed in pressure cooker						[4] 8.2					
Cooking liquor from above, per 100 gm. raw potato.						0.4					
Raw					10.3						
Pared, boiled						[4] 7.8					
Cooking liquor from above, per 100 gm. raw potato.						0.5					
Irish Cobbler; dye titration:											
Grown in Massachusetts					15.7						166
Grown in California					12.2						
Grown in Virginia; 2 months storage					5.9						
Grown in Kentucky					20.0						
Grown in Maine					7.2						
Grown in New York					10.7						

---

[2] Values on cooked- or processed-weight basis.
[4] Values on raw-weight basis.
[6] Unpublished data, Bureau of Home Economics.

Vitamin values per 100 grams of edible portions of foods—Continued

Item	Description of sample	Vitamin A value		Thiamin (vitamin B_1)		Ascorbic acid (vitamin C)		Vitamin D		Riboflavin		References
(1)	(2)	(3a)	(3b)	(4a)	(4b)	(5a)	(5b)	(6a)	(6b)	(7a)	(7b)	(8)
		I. U.	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
Potato—Continued.	Irish Cobbler; average, 5 samples of 8 tubers each; U. S. A.; dye titration.					13.1						166
	Irish Cobbler; Washington, D. C., market sample; rat-growth method:											
	Raw			**150**								8
	Baked 63 minutes at 190° C				[4] **126**							
	Raw			**135**								
	Pared and boiled 36 minutes				[4] **90**							
	Irish Cobbler; average, 8 tubers; U. S. A.; dye titration:											
	Raw					**15.7**						166
	Baked						[2] **6.4**					
	Boiled in skins						[2] 8.3					
	Irish Cobbler; old; U. S. A.; rat-growth method			147								28
	Irish Cobbler; stored 10 months; U. S. A.; dye titration.					8.0						21
	Irish Cobbler; new; U. S. A.; rat-growth method			186								28
	Irish Cobbler; new; U. S. A.; dye titration					14.8						21
	Johannsen; early March; Germany; dye titration:											
	Raw					**15.5**						271
	Pared, boiled 15 minutes in salted water						**12.7**					
	Juliniere; Germany; dye titration:											
	April:											
	Raw					**13.6**						271
	Pared, boiled immediately						**11.8**					
	Unpared, boiled						**13.8**					
	Early March:											
	Raw					**13.9**						
	Pared, boiled 15 minutes in salted water						8.4					
	September:											
	Raw					**19.85**						
	Pared, boiled immediately						**16.46**					
	Unpared, boiled						**17.8**					
	Unpared, steamed						**20.1**					
	Juliniere; autumn samples; Germany; dye titration.					22.15						271
	Kaiserkrone; autumn samples; Germany; dye titration.					20.38						271

Katahdin; dye titration:											
Grown in Massachusetts					12.0						166
Grown in Maine					10.1						
Grown in New York					15.5						
Average for above 3 samples, 8 tubers each					12.5						
Katahdin; U. S. A.; dye titration:											
Baked						[2] **15.0**					166
Stored 5 months, baked						[2] **6.0**					
Pared, boiled						[2] **11.6**					
Stored 5 months, pared, boiled						[2] **4.0**					
Sliced, boiled						[2] **9.5**					
Stored 5 months, sliced, boiled						[2] **4.0**					
Katahdin; average, 8 tubers; U. S. A.; dye titration:											
Raw					**11.0**						166
Baked						[2] **10.8**					
Boiled in skins						[2] **8.0**					
Katahdin; stored 10 months; U. S. A.; dye titration.					10.3						21
Katahdin; new; U. S. A.; dye titration					16.9						21
Kerr's Pink; Scotland; dye titration:											
Harvested July 26					25						241
Harvested Aug. 31					31						
Harvested Sept. 14					14						
King Edward; England; dye titration:											
Average and range, 3 samples; early June					30 26–33						201
Average and range, 3 samples; late June					33 32–34						
Average and range, 4 samples; mid-July					29 25–33						
Average and range, 4 samples; early August					30 32–40						
Average and range, 8 samples; late August					31 28–34						
Average and range, 8 samples; late September					29 23–31						
King Edward; Scotland; dye titration:											
Stored 1 month at 2°–8° C.; (from healthy plants).					**24.5**						241
Stored 1 month at 2°–8° C.; (from plants infected with mosaic).						*28.3*					
Stored 4 months at 2°–8° C.; (from healthy plants).					**9.2**						
Stored 4 months at 2°–8° C.; (from plants infected with mosaic).						*14.7*					
Majestic; Scotland; dye titration:											
Harvested July 26					21						241
Harvested Aug. 31					30						
Harvested Sept. 14					14						

[2] Values on cooked- or processed-weight basis.
[4] Values on raw-weight basis.

Vitamin values per 100 grams of edible portions of foods—Continued

Item (1)	Description of sample (2)	Vitamin A value (3a)	Vitamin A value (3b)	Thiamin (vitamin B_1) (4a)	Thiamin (vitamin B_1) (4b)	Ascorbic acid (vitamin C) (5a)	Ascorbic acid (vitamin C) (5b)	Vitamin D (6a)	Vitamin D (6b)	Riboflavin (7a)	Riboflavin (7b)	References (8)
		I. U.	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
Potato—Continued.	Majestic; Scotland; dye titration:											
	Stored 1 month at 2°–8° C.; (from healthy plants).					18.3						241
	Stored 1 month at 2°–8° C.; (from plants infected with mosaic).						*21.5*					
	Stored 4 months at 2°–8° C.; (from healthy plants).					8.9						
	Stored 4 months at 2°–8° C.; (from plants infected with mosaic).						*7.9*					
	Majestic; [England]; thiochrome method			81								210
	Malta; pared; Holland; thiochrome method:											
	Raw			48								288
	Cooked				[2]20							
	Netted Gem; Montana; dye titration:											
	New, raw					13.3						178
	Cut crosswise and boiled 35 minutes at 95° C						[2]12.8					
	Steamed 45 minutes						[2]14.1					
	Cooked at 17½ pounds steam pressure 5–8 minutes.						[2]11.5					
	Baked 1 hour at 225° C						[2]17.0					
	Fried in butter 20 minutes						[2]11.8					
	Fried in crisco 20 minutes						[2]13.7					
	Cooked, held 24 hours at 4.4° C., and fried in butter 10 minutes.						[2]9.4					
	Mashed after boiling 35 minutes						[2]10.8					
	Escalloped (baked 70 minutes at 176.7° C.)						[2]9.4					
	Stored 6 months at 37.6°–45.9° F. and 81.4–94.4 percent relative humidity.					8.9						
	Stored, cooked 35 minutes at 95° C						[2]8.6					
	Stored, steamed 45 minutes						[2]8.4					
	Stored; cooked at 17½ pounds steam pressure 5–8 minutes.						[2]6.2					
	Stored, baked 1 hour at 225° C						[2]10.8					
	Stored, fried in butter 20 minutes						[2]6.5					
	Stored, fried in crisco 20 minutes						[2]5.6					
	Stored; cooked, held 24 hours at 4.4° C., and fried in butter 10 minutes.						[2]5.4					
	Stored, mashed after boiling 35 minutes						[2]7.2					
	Stored and escalloped (baked 70 minutes at 176.7° C).						[2]6.3					
	Stored 6 months at 55°–60° F. and 42.2–56.9 percent relative humidity.					9.9						
	Stored 6 months at 55°–60° F. and 42.2–56.9 percent relative humidity, cooked 35 minutes at 95° C.						[2]9.5					

Preussen; Germany; dye titration:											
Early March:											
Raw					**13.2**						271
Pared, boiled 15 minutes in salted water						**12.6**					
September:											
Raw					**24.1**						
Pared, boiled immediately						**20.6**					
Pared, soaked 24 hours before cooking						**17.9**					
Unpared, boiled						**17.8**					
Unpared, steamed						**20.1**					
Red King; [England]; thiochrome method			90								210
Redskin; Scotland; dye titration:											
Harvested July 26					21						241
Harvested Aug. 31					24						
Harvested Sept. 14					14						
Red Skin; Scotland; dye titration:											
Stored 1 month at 2°–8° C.; (from healthy plants).					**28.3**						241
Stored 1 month at 2°–8° C.; (from plants infected with mosaic).						*25.9*					
Stored 4 months at 2°–8° C.; (from healthy plants).					**12.6**						
Stored 4 months at 2°–8° C.; (from plants infected with mosaic).						*12.1*					
Red Star; pared; Holland; thiochrome method:											
Raw			**110**								288
Cooked				[2] 58							
Roodzandzaad; pared; Holland; thiochrome method:											
Raw			**90**								288
Cooked				[2] 22							
Rural Russet; dye titration:											
Grown in Massachusetts					16.1						166
Grown in Idaho					6.2						
Grown in New York					10.8						
Average of above 3 samples, 8 tubers each					11.0						
Russet; average, 8 tubers; U. S. A.; dye titration:											
Raw					**16.1**						166
Baked						[2] **9.4**					
Boiled in skins						[2] **10.2**					
Russet; dye titration:											
Baked						[2] **9.2**					166
Stored 5 months, baked						[2] **5.1**					
Pared, boiled						[2] **12.0**					
Stored 5 months, pared, boiled						[2] **3.8**					
Sliced, boiled						[2] **7.6**					
Stored 5 months, sliced, boiled						[2] **3.8**					
Spanish; average and range; Argentina; dye titration.					35 28–45						216

---

[2] Values on cooked- or processed-weight basis.

Vitamin values per 100 grams of edible portions of foods—Continued

Item	Description of sample	Vitamin A value		Thiamin (vitamin B$_1$)		Ascorbic acid (vitamin C)		Vitamin D		Riboflavin		References
(1)	(2)	(3a)	(3b)	(4a)	(4b)	(5a)	(5b)	(6a)	(6b)	(7a)	(7b)	(8)
Potato—Continued.	Triumph; dye titration:	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
	Grown in Idaho					13.2						166
	Grown in Louisiana, 5 months storage					5.1						
	Triumph; U. S. A.; dye titration:											
	Baked						[2] 8.2					166
	Stored 5 months, baked						[2] 6					
	Pared, boiled						[2] 8.2					
	Stored 5 months, pared, boiled						[2] 4.3					
	Sliced, boiled						[2] 8.2					
	Stored 5 months, sliced, boiled						[2] 3.2					
	Up-to-Date; Scotland; dye titration:											
	Stored 1 month at 2°–8° C.; (from healthy plants).					21.2						241
	Stored 1 month at 2°–8° C.; (from plants infected with mosaic).						*24.8*					
	Stored 4 months at 2°–8° C.; (from healthy plants).					10.2						
	Stored 4 months at 2°–8° C.; (from plants infected with mosaic).						*10.4*					
	Warba; average, 8 tubers; dye titration:											
	Raw					14.6						166
	Baked						[2] 7.1					
	Boiled in skins						[2] 10.1					
	White Rose; dye titration:											
	Grown in California					12.1						166
	Grown in Virginia, 2 months' storage					7.3						
	Zeeuwsche Blauven; pared; Holland; thiochrome method:											
	Raw			62								288
	Cooked				[2] 52							
	1 batch; England; dye titration:											
	New, raw					40.6						200
	After cooking, liquid discarded						[4] 18.5					
	40 days after commercial canning, liquid discarded.						[4] 19.3					
	Liquid from cooked sample						1.8					
	Liquid from canned sample						25.0					
	New, raw					29.1						
	After cooking, liquid discarded						[4] 25.0					
	7 days after commercial canning, liquid discarded.						[4] 21.9					
	Liquid from cooked sample						4.9					
	Liquid from canned sample						11.5					

New; average, 2 batches; England; dye titration					34.8						200
[England]; thiochrome method			90								210
Boiled; England; thiochrome method				[2] 120							209
New, cooked; average and range; [England]; dye titration.						[2] 15 [2] 10–20					202
Old, cooked; average and range; [England]; dye titration.						[2] 8 [2] 7–10					202
Boiled and peeled; [England]; bradycardia method				[2] 90							11
Fried chips; [England]; thiochrome method				[2] 114							209
In strips; Germany; dye titration:											
Fresh					15.4						59
Dried						[8] 5.6					
Dried						[4] 0.7					
Average and range; stored from October–June; Germany; dye titration:											
October:											
Raw					24.2 21.5–32						271
Boiled						17.9 13.1–23.4					
November:											
Raw					20.2 15.6–26.2						
Boiled						15.3 10.6–18.6					
February:											
Raw					13.9 7.4–19.2						
Boiled						11.7 6.7–16.6					
April:											
Raw					10.0 6.4–13.8						
Boiled						8.2 5.2–12.8					
June:											
Raw					8.9 6.8–12.8						
Boiled						7.7 5.5–9.3					
Holland; dye titration					31.1						269
Holland; dye titration:											
Raw					32.1						269
Cooked 45 minutes						[2] 25.9					
Unpared; India; fluorometric method									43		195
India; dye titration:											
Raw					17.3						211
Unpared; boiled						[2] 17.1					
India; dye titration					12.5						1

---

[2] Values on cooked- or processed-weight basis.
[4] Values on raw-weight basis.
[8] Values on dry-weight basis.

Vitamin values per 100 grams of edible portions of foods—Continued

Item (1)	Description of sample (2)	Vitamin A value (3a)	Vitamin A value (3b)	Thiamin (vitamin B$_1$) (4a)	Thiamin (vitamin B$_1$) (4b)	Ascorbic acid (vitamin C) (5a)	Ascorbic acid (vitamin C) (5b)	Vitamin D (6a)	Vitamin D (6b)	Riboflavin (7a)	Riboflavin (7b)	References (8)
Potato—Continued.	Italy; rat-growth and dye titration methods, respectively:	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
	Raw			**150**		**7.0**						54
	Cooked				[2] **150**		[2] **6**					
	[Japan]; modified dye titration					11.2						90
	Rumania; dye titration:											
	Raw					22.0–25.5						204
	Cooked						[2] 6.0–17.5					
	Average and range, 9 varieties stored 4 weeks at 2°–8° C.; Scotland; dye titration.					22.0 17.2–28.3						241
	Average and range, 12 varieties stored 2 months at 2°–8° C.; Scotland; dye titration.					13.3 10.0–21.2						241
	Average and range, 16 varieties stored 4 months at 2°–8° C.; Scotland; dye titration.					9.2 7.5–12.6						241
	Average and range, 18 varieties stored 6 months at 2°–8° C.; Scotland; dye titration.					9.1 7.0–11.3						241
	Sweden; fluorometric method									10		67
	New; U. S. A.; dye titration					17						22
	Old; U. S. A.; dye titration					8						22
	Average, 8 varieties of 8 tubers each; U. S. A.; dye titration:											
	Raw					**15.8**						166
	Baked						[2] **8.1**					
	Boiled in skins						[2] **9.9**					
	U. S. A.; dye titration					10						196
	U. S. A.; fluorometric method									44		126
	do									55		126
	Cooked; U. S. A.; dye titration						[2] 3.1					68
Juice	Fresh; U. S. A.; dye titration					[3] 2.1						102
Various parts	India; dye titration:											
	Flesh					36.3						225
	Skin					56.0						
	Average, 4 varieties; Scotland; dye titration:											
	Sprouted in dark, stem end						6.2					241
	Sprouted in dark, middle section						6.7					
	Sprouted in dark, bud end						8.8					
	Sprouted in light, stem end						7.7					
	Sprouted in light, middle section						7.1					
	Sprouted in light, bud end						10.1					

	Irish Cobbler; baked; Massachusetts; dye titration:											
	Average and range, center portions						[2]14.0 [2]8.9–21.0					166
	Average and range, median portions						[2]11.4 [2]7.3–14.9					
	Average and range, epidermal portions						[2]8.6 [2]6.3–13.0					
Prickly apple	[Zuurzak]; Java; dye titration					22.9						244
Prune	Fresh; California	1,000 or more										189
	Commercial samples; steamed and canned; U. S. A.; dye titration:											
	In tin containers; 2 samples						[2]0.7–5.5					199
	In glass container; 1 sample						[2]2.4					
	Pulp, frozen; Boston market sample; spectrographic method.		[1] [2]2,600									82
Dried	Boston market sample; spectrographic method	[1]1,400–3,460										82
	Tenderized; California; rat-growth method	1,560										29
	U. S. A.; rat-growth method			180								28
	Cooked; U. S. A.; dye titration						0					68
	Thiochrome method:											
	Raw			114								209
	Stewed				[2]90							
	Raw; bradycardia method			270								11
	Cooked; dye titration						[2]1					202
Pumpkin	Big Tom variety of field pumpkin; cooked; Maryland; rat-growth method.		[4]1,200									29
	Brown variety; India; dye titration					2.0						211
	White variety; India; dye titration					0.9						211
	India; dye titration					1.1						1
Various parts	India; dye titration:											
	Flesh					5.1						225
	Leaves					10						
	Seeds					3						
	Skin					10						
Rabbit	[England]; thiochrome method			33								209
	Muscle; U. S. A.; dye titration					4						22
	Stewed; [England]; bradycardia method				[2]60–120							11
Various organs (see liver).												

---

[1] International Unit values were calculated from carotene analyses or included carotene analyses.
[2] Values on cooked- or processed-weight basis.
[3] Values per 100 ml.
[4] Values on raw-weight basis.

Vitamin values per 100 grams of edible portions of foods—Continued

Item (1)	Description of sample (2)	Vitamin A value (3a)	(3b)	Thiamin (vitamin B_1) (4a)	(4b)	Ascorbic acid (vitamin C) (5a)	(5b)	Vitamin D (6a)	(6b)	Riboflavin (7a)	(7b)	References (8)
		I. U.	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
Radish	Scarlet Globe; Washington, D. C., market; Maryland; rat-growth method.	<30										29
	White-icicle; U. S. A.; dye titration					26.1						34
	Average and range; Argentina; dye titration					27 26–28						216
	[England]; thiochrome method			39								209
	[England]; bradycardia method			180								11
	Pink variety; India; dye titration					16.9						211
	India; dye titration					15.0						211
	do					40						1
	India; fluorometric method									20		291
	Red; U. S. A.; dye titration					25						21
	U. S. A.; fluorometric method									35		126
Various parts	India; dye titration:											
	Flesh					16						225
	Leaves					43						
	Skin					44						
	Young leaves; India; dye titration					113.8						1
Raisin	Sultana; California; rat-growth method	Nil										29
	U. S. A.; rat-growth method			108								(6)
	Bradycardia method			225								11
	Thiochrome method			87								209
Raspberry	Black; Washington, D. C., market; California; rat-growth method.	Nil										29
	Black; U. S. A.; rat-growth method			<25								28
	Red; Washington, D. C., market; New Jersey; rat-growth method.	133										29
	Red; fresh; U. S. A.; dye titration					25						21
	Red; U. S. A.; rat-growth method			<25								28
	Red; frozen; Boston market sample; spectrographic method.		[1] [2] 520									82
	Average and range; England; dye titration					25 21–37						202
	Fresh; average, 1 batch; England; dye titration					30.5						200
	England; dye titration:											
	Fresh					19						202
	Made into jam						[2] 8					
	[England]; bradycardia method			75–105								13
	Average, 2 varieties; Germany; dye titration					37.6						229

	Cooked or canned; average and range; England; dye titration.						[2]10 [2]4-17					202
	Canned; [England]; thiochrome method				[2]6							209
	Germany; dye titration:											
	Fresh					32.2						5
	Canned in glass						[4]24.9					
	Canned in tin						[4]31.5					
	Juice; Denmark; dye titration:											
	Fresh, raw					[3]18						138
	Pasteurized 30 minutes at 65° C						[3]18					
	Pasteurized 30 minutes at 80° C						[3]17					
	Pasteurized 30 minutes at 60°-80° C., stored 7 months at 15° C.						[3]13					
	Juice, commercial, pasteurized; England						[3]20					39
Rhubarb	Flare; garden fresh; Ohio; dye titration					44.4						34
	Nyatt's Victoria; April; grown near Washington, D. C.; rat-growth method.	ca 100										29
	Boston market sample; spectrographic method	Trace										82
	Frozen; Boston market sample; spectrographic method.		[1,2]1,300									82
	[England]; bradycardia method			0								11
	[England]; thiochrome method			12								209
	Germany; dye titration:											
	Thick stems					11.8						229
	Thin stems					9.2						
	Stalks; India; dye titration					36.7						211
	Massachusetts; dye titration:											
	Raw					11.7						42
	Cooked						[2]3.2					
	Canned, 2 samples						[2]1.5 [2]1.7					
	U. S. A.; dye titration					13						264
	do					16						264
	do					21						22
	U. S. A.; rat-growth method			< 25								28
	Fresh juice; U. S. A.; dye titration						[3]27.8					102
	Canned; Massachusetts; dye titration						[2]1.5					42
	do						[2]1.7					42
	Canned sauce; commercial samples; U. S. A.; dye titration:											
	In tin containers, 2 samples						[2]2.0					199
	In glass container, 1 sample						[2]2.6					
Rice	Brown, unmilled; India; fluorometric method									122		195
	Brown, unmilled; parboiled; India; fluorometric method.										124	195

---

[1] International Unit values were calculated from carotene analyses or included carotene analyses.
[2] Values on cooked- or processed-weight basis.
[3] Values per 100 ml.
[4] Values on raw-weight basis.
[6] Unpublished data, Bureau of Home Economics.

Vitamin values per 100 grams of edible portions of foods—Continued

Item (1)	Description of sample (2)	Vitamin A value (3a)	Vitamin A value (3b)	Thiamin (vitamin B_1) (4a)	Thiamin (vitamin B_1) (4b)	Ascorbic acid (vitamin C) (5a)	Ascorbic acid (vitamin C) (5b)	Vitamin D (6a)	Vitamin D (6b)	Riboflavin (7a)	Riboflavin (7b)	References (8)
		I. U.	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
Rice—Continued.	Brown; Maine market sample; dye titration					0						43
	Brown; Washington, D. C., market sample; rat-growth method.	Nil										29
	Brown; rat-growth method			420								(6)
	Whole grain; India; dye titration:											
	Dry seeds, ungerminated					2.4						197
	After 24-hour germination						2.6					
	After 48-hour germination						3.2					
	After 96-hour germination						5.1					
	After 120-hour germination						8.5					
	Polished; India; modified thiochrome method			33								193
	White, unpolished; India; fluorometric method									70		291
	White, milled and polished; India; fluorometric method.									80		291
	White, polished; rat-growth method			ca 10								(6)
Bran	Bradycardia method			2, 280								11
	do			1, 680								11
Polishings	U. S. A.; thiochrome method			1, 900								120
	U. S. A.; rat-growth method			2, 220								(6)
Wild	Washington, D. C., market sample; rat-growth method.			600								(6)
Wine	Fermented rice; Japan; lumiflavin method:											
	Wine (saki)									1.6–7.1		249
	Residue from above wine										47.3	
	Fermented sweet rice wine (saki); Japan; lumiflavin method.									1.6		249
Roe	Cod; Greenland; dye titration					44						134
	Cod, smoked; thiochrome method				[2] 900							209
	Cod, canned; 1 sample:											
	Oxidation method										[2] 650	163
	Rat-growth method										[2] 600	
	Cod, canned; roe or *Gadus morrhua*; Norway; rat-bioassay.							85				6
	Crab, canned; 1 sample:											
	Oxidation method										[2] 870	163
	Rat-growth method										[2] 750	
	Red herring, fresh; Germany; chromatographic and colorimetric method.										192.6	233
	Herring; thiochrome method			30								209
	Turbot, fresh; Germany; chromatographic and colorimetric method.									908.4		233

Rose hips (see Hip, rose).												
Rutabaga	American Purple Top; Washington, D. C., market; cooked; Maryland; rat-growth method.		Nil									29
	[England]; thiochrome method			75								209
	U. S. A.; rat-growth method			75								28
Rye:												
Flour	94 percent extraction of grain; Germany			300								2
	65 percent extraction of grain; Germany			144								2
	40 percent extraction of grain; Germany			72								2
Germ	[England]; bradycardia method			2, 250								11
Green plant	Michigan; chromatographic-spectrographic method.	[1] 15, 400										187
	do	[1] 16, 250										187
	Fresh green plants, 6–15 inches high; U. S. A.; colorimetric method.	[1] 9, 200										7
	do	[1] 14, 000										7
Whole grain	Fermentation method:											
	Abruzzes; Virginia; obtained Washington, D. C.			410								235
	Balboa; Virginia; obtained Washington, D. C.			500								
	Dakold; Nebraska; obtained Washington, D. C.			570								
	Dakold; obtained Washington, D. C.			570								
	Raritan; Virginia; obtained Washington, D. C.			450								
	Rimpau; Virginia; obtained Washington, D. C.			500								
	Rosen; Michigan; obtained Washington, D. C.			450								
	Rosen; obtained Michigan			400								
	Smooth Neck; Virginia; obtained Washington, D. C.			500								
	Wis. Ped.; Wisconsin; obtained Washington, D. C.			470								
	Average and range, 2 samples; Holland; thiochrome method.			320 290–340								288
	Germany			300								2
	No. 2; U. S. A.; rat-growth method	Nil										29
	U. S. A.; rat-growth method			468								28
	do			393								28
Sage	Garden fresh; Ohio; dye titration					25. 0						34
Sago	Thiochrome method			Nil								209
Salmon	Back muscle; 43.2 percent moisture; Japan; lumiflavin method.									37. 9		249
	Red char, salted; 5.6 percent fat; Norway; rat bioassay.							1, 120				6

---

[1] International Unit values were calculated from carotene analyses or included carotene analyses.

[2] Values on cooked- or processed-weight basis.

[6] Unpublished data, Bureau of Home Economics.

Vitamin values per 100 grams of edible portions of foods—Continued

Item	Description of sample	Vitamin A value		Thiamin (vitamin B_1)		Ascorbic acid (vitamin C)		Vitamin D		Riboflavin		References
(1)	(2)	(3a)	(3b)	(4a)	(4b)	(5a)	(5b)	(6a)	(6b)	(7a)	(7b)	(8)
		I. U.	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
Salmon—Con.												
Canned	Chinook; commercial samples; Columbia River; rat-growth and rat-curative methods, respectively.	>400						210				57
	do	800						260				57
	Chinook; commercial sample; Columbia River; rat-curative method.							390				57
	Chum; commercial samples; Alaska; rat-growth and rat-curative methods, respectively.	25–30						190–260				57
	do	25						190				57
	do	30						260				57
	Pink; commercial sample; Alaska; rat-curative method.							710				57
	do							400				57
	Pink; commercial sample; Alaska; rat-growth and rat-curative methods, respectively.	100						760				57
	do	100						620				57
	Red; commercial samples; [Alaska]; rat-growth and rat-curative methods, respectively.	400						800				57
	Red; commercial sample; Alaska; rat-growth method.	250										57
	Red; liquid discarded; rat-growth method			Trace								28
	Thiochrome method			114								209
Salsify	Sandwich Island; U. S. A.; dye titration					7.3						34
Sardines	Brisling; 1 sample; Norway:											
	Lumiflavin method									160-230		163
	Oxidation method									620		
	Rat-growth method									350		
	Brisling; Norway; rat-growth and rat-curative methods, respectively:											
	Raw, 1933	303							1,166			162
	Smoked, 1933		[2] 387						[2] 1,370			
	Canned, 1933		[2] 273									
	Canned, 1933; 2.5 months after canning								[2] 1,150			
	Canned, 1933; 5 months after canning								[2] 1,570			
	Raw, 1936	254						1,450				
	Smoked, 1936; 1 sample		[2] 413						[2] 1,550			
	Canned, 1936; 23–27 months after canning		[2] 357									
	Canned, 1936; 3–11 months after canning								[2] 1,417			
	Canned, aluminum pack; 4 years after canning; 1 sample.		[2] 270									
	Canned, aluminum pack; 8 years after canning; 1 sample.								[2] 1,850			

	Back muscle; 83.4 percent moisture; Japan; lumiflavin method.									53.2		248
	Small herring, "sild," raw; livers included; Norway; bioassay:											
	4.2 percent fat							610				
	5.2 percent fat							830				
	8.3 percent fat							580				
Canned	"Sild"—sardines; packing oil included; Norway; bioassay:											6
	Range, 3 samples stored 4 days–6½ months								[2] 290–620			
	Range, 9 samples stored 7–9 years								[2] 390–1,000			
	Thiochrome method			30								209
	Commercial canned in cottonseed oil; U. S. A.; rat-growth method.	[2] 136										29
Sauerkraut	Germany; dye titration					0						161
	Germany; dye titration:											
	Raw					8.8						161
	Steamed						[4] 2.3					
	Raw kraut from various factories; U. S. A.; dye titration:											
	Average, solids aged 1 month or less					29						
	Liquid from above solids						32.2					
	Average, solids aged 1–3 months					25.7						205
	Liquid from above solids						23.2					
	Average, solids aged 7–11 months					14						
	Liquid from above solids						10.3					
	U. S. A.; dye titration:											
	Raw kraut					35						
	Liquid from raw kraut						37					
	After mixing vat; liquid						11					
	After filling table; solids						19					
	After filling table; liquid						15					
	After preheater; solids						10					
	After preheater; liquid						9					
	After preheater; water added; solids						11					
	After preheater; water added; liquid						12					
	After canning; solids						11					
	After canning; liquid						12					205
	Cabbage cut September 1935, fresh solids					41						
	Juice, fresh						3					
	Kraut solids after fermenting 2 months						[2] 37					
	Liquid after 2 months' fermentation						43					
	Kraut solids after cooking						[2] 23					
	Liquid after cooking						27					
	Canned kraut, 1 month after canning						[2] 23					
	Canned liquid, 1 month after canning						25					
	Canned kraut, 4 months after canning						[2] 23					
	Canned liquid, 4 months after canning						24					
	U. S. A.; rat-growth method			<30								28

[2] Values on cooked- or processed-weight basis.

[4] Values on raw-weight basis.

Vitamin values per 100 grams of edible portions of foods—Continued

Item (1)	Description of sample (2)	Vitamin A value (3a)	Vitamin A value (3b)	Thiamin (vitamin B₁) (4a)	Thiamin (vitamin B₁) (4b)	Ascorbic acid (vitamin C) (5a)	Ascorbic acid (vitamin C) (5b)	Vitamin D (6a)	Vitamin D (6b)	Riboflavin (7a)	Riboflavin (7b)	References (8)
Sauerkraut—Con.												
Canned	Aged 1 month before canning; U. S. A.; dye titration:	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
	Solids 1 month after canning					26						205
	Liquid from above sample						28					
	Solids 2 months after canning					23						
	Liquid from above sample						25					
	Solids 6 months after canning					23						
	Liquid from above sample						24					
	Aged 3 months before canning, 7 months after canning; U. S. A.; dye titration:											
	Solids					13						205
	Liquid from above sample						14					
	Aged 10 months before canning; U. S. A.; dye titration:											
	Solids, 5 days after canning					12						205
	Liquid from above sample						15					
	Solids, 10 days after canning					21						
	Liquid from above sample						21					
	Commercial samples; U. S. A.; dye titration:											
	In tin containers; average and range, 3 samples.					8.2 5–15						199
	In glass container, 1 sample					7.5						
	Commercially canned; U. S. A.; rat-growth method.	0										29
	Juice; U. S. A.; dye titration					[3] 8.2						102
Sausage (see Pork).												
Scallops	Washington, D. C., market sample; rat-growth method.	Nil										29
Seal	Fjord seal; flesh; Greenland; dye titration					2						134
Various organs (see Liver).												
Sea mussel	Greenland; dye titration					6						134
Seaweed	Chlorophyceae Ulva lactuca; green; February–April; dye titration.					27–28						165
	Fucoidae; 9 species or varieties; dye titration					3–77						165
	Rhodophyceae; 3 species or red varieties; dye titration.					24–83						165
	Laver; China; dye titration					61.10						41

Semolina (see Wheat, various milled products).												
Sesame:												
Paste	China; dye titration					20.30						41
Seed	China; dye titration:											
	Black					38.28						41
	White					29.87						
Shallots:												
Various parts	Average and range, 2 samples; Texas; dye titration:											
	Green stem					22.3 17.6–26.9						85
	White bulb					7.7 7.6–7.8						
Shepherd's purse	Ohio; dye titration					129.6						35
Shrimp	2.5 percent fat; Norway; rat bioassay							150				6
Sirup	Black currant, commercial cold process, sugar added to 65 percent concentration; dye titration:											
	Initial value					[2,3] 80						70
	After bulk storage in dark for 435 days						[2,3] 68.2					
	After storage in glass at window for 152 days						[2,3] 62.6					
	Corn, commercially refined									0		103
Skunk cabbage	Ohio; dye titration					315.0						35
Slender nettle	do					100.7						35
Smelt	Pond smelt; whole body; 68.3 percent moisture; Japan; lumiflavin method.									125.7		248
Sole	Dover; thiochrome method			57								209
	Lemon; thiochrome method			87								209
Sorghum	Cereal; China; dye titration					29.10						41
	Kaffir corn; India; dye titration:											
	Dry seeds					1.96						197
	After 24 hours germination						3.4					
	After 48 hours germination						10.6					
	After 96 hours germination						15.8					
Sorrel (see Dock).												
Sow thistle	Ohio; dye titration					63.3						35

---

[2] Values on cooked- or processed-weight basis.
[3] Values per 100 ml.

Vitamin values per 100 grams of edible portions of foods—Continued

Item	Description of sample	Vitamin A value		Thiamin (vitamin B_1)		Ascorbic acid (vitamin C)		Vitamin D		Riboflavin		References
(1)	(2)	(3a)	(3b)	(4a)	(4b)	(5a)	(5b)	(6a)	(6b)	(7a)	(7b)	(8)
		I. U.	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
Soybean	Bausei; green, freshly shelled; U. S. A.; dye titration.					40.4						34
	Jogun; green, freshly shelled; U. S. A.; dye titration.					42.8						34
	Immature, grown on sandy loam soil fertilized with superphosphate and muriate of potash; Alabama; spectrophotometric method:											
	Tanloxi	[1]1,175										240
	FPI-No. 93,057	[1]1,138										
	FPI-No. 84,642	[1]1,066										
	Biloxi	[1]900										
	Mathews	[1]848										
	Mamlox	[1]828										
	FPI-No. 91,425	[1]828										
	FPI-No. 83,868	[1]800										
	FPI-No. 71,543	[1]793										
	Delnoshat	[1]793										
	Ebony	[1]790										
	FPI-No. 85,560	[1]688										
	Chame	[1]680										
	FPI-No. 95,733	[1]673										
	Hahto, green selection	[1]671										
	FPI-No. 86,506	[1]648										
	FPI-No. 85,883	[1]645										
	FPI-No. 64,722	[1]637										
	FPI-No. 87,079	[1]628										
	Hahto, yellow selection	[1]625										
	FPI-No. 83,936	[1]600										
	FPI-No. 85,523	[1]570										
	Rokusun	[1]540										
	Kura	[1]485										
	FPI-No. 60,296	[1]431										
	FPI-No. 82,196	[1]428										
	Higan	[1]353										
	Green; U. S. A.; rat-growth method			472								28
Mature	Biloxi; dry; U. S. A.; rat-growth methods	0		1,050								105
	do			1,170								105
	Herman; dry; U. S. A.; rat-growth methods	50		1,080								105
	Laredo; dry; U. S. A.; rat-growth methods	130		1,230								105
	Mammoth yellow; dry; U. S. A.; rat-growth methods.	0		960								105
	do			1,140								105

Otootan; dry; U. S. A.; rat-growth methods	130		1,110								105
do			1,230								105
Rokusun; dry; U. S. A.; rat-growth methods	0		1,170								105
Sousei; dry-cooked; Virginia; rat-growth method		0									29
Tarheel black; dry; U. S. A.; rat-growth methods	0		990								105
do	50		1,230								105
Tokyo; dry; U. S. A.; rat-growth methods	0		960								105
do	50										105
Virginia; dry; U. S. A.; rat-growth methods	0		1,290								105
do	50		1,440								105
6-9 percent moisture; grown on sandy loam soil fertilized with superphosphate and muriate of potash; allowed to mature in field; stored 4 months; Alabama; spectrophotometric method:											
FPI-No. 93,057; 1937 crop	[1] 406										240
FPI-No. 85,076; 1936 crop	[1] 350										
FPI-No. 85,076; 1937 crop	[1] 333										
FPI-No. 94,168; 1936 crop	[1] 296										
FPI-No. 94,168; 1937 crop	[1] 263										
FPI-No. 94,166; 1936 crop	[1] 328										
FPI-No. 94,166; 1937 crop	[1] 251										
Ebony; 1937 crop	[1] 226										
FPI-No. 86,022; 1936 crop	[1] 287										
FPI-No. 86,506; 1936 crop	[1] 275										
FPI-No. 85,384; 1936 crop	[1] 271										
FPI-No. 85,384; 1937 crop	[1] 187										
George Washington; 1937 crop	[1] 204										
Mathews; 1937 crop	[1] 195										
Norredo; 1937 crop	[1] 170										
FPI-No. 82,196; 1936 crop	[1] 191										
FPI-No. 82,196; 1937 crop	[1] 118										
Hahto; green selection; 1936 crop	[1] 167										
Hahto; green selection; 1937 crop	[1] 121										
Kura; 1937 crop	[1] 153										
Peking; 1937 crop	[1] 146										
FPI-No. 83,868; 1936 crop	[1] 137										
FPI-No. 83,868; 1937 crop	[1] 139										
FPI-No. 71,543; 1937 crop	[1] 136										
Mandell; 1936 crop	[1] 136										
FPI-No. 84,785; 1937 crop	[1] 132										
Hahto; yellow selection; 1936 crop	[1] 120										
Hahto; yellow selection; 1937 crop	[1] 106										
Chame; 1937 crop	[1] 106										
Easy Cook; 1936 crop	[1] 70										
Easy Cook; 1937 crop	[1] 103										
FPI-No. 85,523; 1936 crop	[1] 109										
FPI-No. 85,523: 1937 crop	[1] 98										
FPI-No. 96,018; 1936 crop	[1] 127										
FPI-No. 96,018: 1937 crop	[1] 92.6										
Mammoth Yellow; 1937 crop	[1] 83.6										

---

[1] International Unit values were calculated from carotene analyses or included carotene analyses.

Vitamin values per 100 grams of edible portions of foods—Continued

Item	Description of sample	Vitamin A value		Thiamin (vitamin B_1)		Ascorbic acid (vitamin C)		Vitamin D		Riboflavin		References
(1)	(2)	(3a)	(3b)	(4a)	(4b)	(5a)	(5b)	(6a)	(6b)	(7a)	(7b)	(8)
Soybean—Con. Mature—Con.	6-9 percent moisture, etc.—Continued.	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
	FPI-No. 91,425; 1936 crop	[1] 42.6	------	------	------	------	------	------	------	------	------	240
	FPI-No. 91,425; 1937 crop	[1] 88.3	------	------	------	------	------	------	------	------	------	
	FPI-No. 84,642; 1936 crop	[1] 112	------	------	------	------	------	------	------	------	------	
	FPI-No. 84,642; 1937 crop	[1] 75.6	------	------	------	------	------	------	------	------	------	
	Tokio; 1936 crop	[1] 82.0	------	------	------	------	------	------	------	------	------	
	FPI-No. 95,733; 1936 crop	[1] 74.3	------	------	------	------	------	------	------	------	------	
	FPI-No. 95,733; 1937 crop	[1] 81.8	------	------	------	------	------	------	------	------	------	
	Dunfield; 1936 crop	[1] 66.6	------	------	------	------	------	------	------	------	------	
	FPI-No. 85,883; 1936 crop	[1] 40.0	------	------	------	------	------	------	------	------	------	
	FPI-No. 85,883; 1937 crop	[1] 68.3	------	------	------	------	------	------	------	------	------	
	Tanloxi; 1937 crop	[1] 65.7	------	------	------	------	------	------	------	------	------	
	Tarheel black; 1936 crop	[1] 63.6	------	------	------	------	------	------	------	------	------	
	Rokusun; 1936 crop	[1] 48.5	------	------	------	------	------	------	------	------	------	
	Rokusun; 1937 crop	[1] 63.4	------	------	------	------	------	------	------	------	------	
	Biloxi; 1937 crop	[1] 62.0	------	------	------	------	------	------	------	------	------	
	Higan; 1937 crop	[1] 59.2	------	------	------	------	------	------	------	------	------	
	Mamredo; 1936 crop	[1] 48.2	------	------	------	------	------	------	------	------	------	
	Mamotan; 1936 crop	[1] 42.7	------	------	------	------	------	------	------	------	------	
	Delsta; 1936 crop	[1] 29.1	------	------	------	------	------	------	------	------	------	
	Delsta; 1937 crop	[1] 41.1	------	------	------	------	------	------	------	------	------	
	Delnoshat; 1936 crop	[1] 30.3	------	------	------	------	------	------	------	------	------	
	Delnoshat; 1937 crop	[1] 34.5	------	------	------	------	------	------	------	------	------	
	Mamlox; 1936 crop	[1] 38.1	------	------	------	------	------	------	------	------	------	
	Mamlox; 1937 crop	[1] 31.8	------	------	------	------	------	------	------	------	------	
	Grown on sandy loam soil fertilized with superphosphate and muriate of potash; stored 6 months; Alabama; chromatographic-spectrophotometric method:											
	FPI-No. 85,384	[1] 159.8	------	------	------	------	------	------	------	------	------	239
	FPI-No. 94,168	[1] 230.3	------	------	------	------	------	------	------	------	------	
	Mathews	[1] 173.2	------	------	------	------	------	------	------	------	------	
	Kura	[1] 134.5	------	------	------	------	------	------	------	------	------	
	FPI-No. 93,057; stored 6 months; U. S. A.; chromatographic-spectrophotometric methods.	[1] 233.7	------	------	------	------	------	------	------	------	------	239

	6-9 percent moisture; grown on sandy loam soil; fertilized with superphosphate and muriate of potash; Alabama; spectrophotometric method:											
	FPI-No. 84,734; matured in field	[1] 150										240
	FPI-No. 84,734; harvested 2-3 weeks later		[1] 55.0									
	FPI-No. 85,667; matured in field	[1] 90										
	FPI-No. 85,667; harvested 2-3 weeks later		[1] 57.0									
	FPI-No. 66,296; matured in field	[1] 42.7										
	FPI-No. 66,296; harvested 2-3 weeks later		[1] 39.0									
	FPI-No. 82,213; matured in field	[1] 116.0										
	FPI-No. 82,213; harvested 2-3 weeks later		[1] 64.0									
	FPI-No. 64,722; matured in field	[1] 59.1										
	FPI-No. 64,722; harvested 2-3 weeks later		[1] 39.0									
	FPI-No. 84,166; matured in field	[1] 270										
	FPI-No. 84,166; harvested 2-3 weeks later		103									
	FPI-No. 93,057; matured in field	[1] 405										
	FPI-No. 93,057; harvested 2-3 weeks later		[1] 288									
	FPI-No. 87,079; matured in field	[1] 168										
	FPI-No. 87,079; harvested 2-3 weeks later		[1] 115									
	Mammoth Yellow; matured in field	[1] 83.7										
	Mammoth Yellow; harvested 2-3 weeks later		[1] 64.0									
	Easy Cook; matured in field	[1] 102.8										
	Easy Cook; harvested 2-3 weeks later		[1] 56.5									
	Mamlox; matured in field	[1] 31.8										
	Mamlox; harvested 2-3 weeks later		[1] 20.0									
	Dry; China; dye titration:											
	Black					46.66						41
	Green					17.75						
	Dry; India; fluorometric method									323		195
	Dry; average, 9 varieties; U. S. A.; rat-growth method.			1,140								105
	Dry; U. S. A.; rat-growth method			1,455								28
Meal	1 sample; U. S. A.:											
	Fluorometric method									1,900		250
	Rat-growth method									850		
	U. S. A.; microbiological method									300		242
Soy sauce	Japan; lumiflavin method									21.2		249
	do									25.3		
	Residue from soya sauce; 16 percent moisture; lumiflavin method:										710.5	249
Spinach	Bloomsdale Savoy; Washington, D. C., market sample; rat-growth method:											
	Fresh			129								8
	Boiled 9 minutes				[4] 90							

---

[1] International Unit values were calculated from carotene analyses or included carotene analyses.
[4] Values on raw-weight basis.

Vitamin values per 100 grams of edible portions of foods—Continued

Item	Description of sample	Vitamin A value		Thiamin (vitamin B$_1$)		Ascorbic acid (vitamin C)		Vitamin D		Riboflavin		References
(1)	(2)	(3a)	(3b)	(4a)	(4b)	(5a)	(5b)	(6a)	(6b)	(7a)	(7b)	(8)
Spinach—Continued.	Broad Flanders; New York; dye titration:											
	Spring:	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
	Grown on muck soil					49						264
	Grown on upland soil					89						
	Autumn:											
	Grown on muck soil					56						
	Grown on upland soil					113						
	Eskimo; spring; New York; dye titration:											
	Grown on muck soil					62						
	Grown on upland soil					77						
	Hollandia; New York; dye titration:											
	Spring:											
	Grown on muck soil					42						
	Grown on upland soil					75						
	Autumn:											
	Grown on muck soil					63						
	Grown on upland soil					99						
	Hollandia; New York; dye titration:											
	Fresh					**79**						
	Stored 3 days at 1°–3° C						**76**					
	Stored 7 days at 1°–3° C						**64**					
	Stored 17 days at 1°–3° C						**49**					
	Stored 3 days at 23°–26° C						**39**					
	Stored 7 days at 23°–26° C						**3**					
	King of Denmark; New York; dye titration:											
	Spring:											
	Grown on muck soil					40						
	Grown on upland soil					64						
	Autumn:											
	Grown on muck soil					65						
	Grown on upland soil					80						
	Long Standing Bloomsdale; New York; dye titration:											
	Spring:											
	Grown on muck soil					49						
	Grown on upland soil					74						
	Autumn:											
	Grown on muck soil					55						
	Grown on upland soil					80						
	Nobel; New York; dye titration:											
	Spring:											
	Grown on muck soil					55						
	Grown on upland soil					79						

Autumn:											
Grown on muck soil					53						264
Grown on upland soil					107						
Old Dominion; New York; dye titration:											
Spring:											
Grown on muck soil					56						
Grown on upland soil					70						
Autumn:											
Grown on muck soil					65						
Grown on upland soil					102						
Prickly Winter; New York; dye titration:											
Spring:											
Grown on muck soil					46						
Grown on upland soil					75						
Autumn:											
Grown on muck soil					48						
Grown on upland soil					95						
Prickly Winter; New York; dye titration:											
Fresh					78						
Stored 3 days at 1°–3° C						**76**					
Stored 7 days at 1°–3° C						**72**					
Stored 17 days at 1°–3° C						**39**					
Stored 3 days at 23°–26° C						**44**					
Stored 7 days at 23°–26° C						**5**					
Princess Juliana; New York; dye titration:											
Spring:											
Grown on muck soil					38						264
Grown on upland soil					53						
Autumn:											
Grown on muck soil					65						
Grown on upland soil					72						
Victoria; spring; New York; dye titration:											
Grown on muck soil					55						264
Grown on upland soil					66						
Victoria; autumn; grown on muck soil; New York; dye titration.					59						264
Viking; autumn; New York; dye titration:											
Grown on muck soil					61						264
Grown on upland soil					113						
Virginia Savoy; New York; dye titration:											
Spring:											
Grown on muck soil					48						264
Grown on upland soil					80						
Autumn:											
Grown on muck soil					67						
Grown on upland soil					105						
Virginia Savoy; New Jersey; rat-growth method:											
Fresh			**108**								72
Frozen after blanching 1.75 minutes at 100° C.				[2] **102**							
Canned 50 minutes at 122.2° C. in No. 2.5 can after blanching 1.75 minutes at 100° C.				[2] **60**							
Liquid from above sample				**30**							

---

[2] Values on cooked- or processed-weight basis.

Vitamin values per 100 grams of edible portions of foods—Continued

Item	Description of sample	Vitamin A value		Thiamin (vitamin B₁)		Ascorbic acid (vitamin C)		Vitamin D		Riboflavin		References
(1)	(2)	(3a)	(3b)	(4a)	(4b)	(5a)	(5b)	(6a)	(6b)	(7a)	(7b)	(8)
		I. U	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
Spinach—Continued	Viroflay; inner leaves; Germany; modified dye method.					100						32
	Viroflay; New York; dye titration:											
	Spring:											
	Grown on muck soil					53						264
	Grown on upland soil					78						
	Autumn:											
	Grown on muck soil					54						
	Grown on upland soil					88						
	Average and range; Argentina; dye titration					32 11–47						216
	Boston market; spectrographic method	[1] 6,600–25,000										82
	Average or range; Boston market; dye titration:											
	January–March; Texas					35–38						82
	December; Texas					41						
	April; Virginia					41						
	November; Virginia					68						
	May–October; Massachusetts					14–47						
	Range, 2 batches; England; dye titration:											
	Fresh					32.1–46.9						200
	After cooking, liquid discarded						[4] 30.0–40.9					
	After commercial canning, liquid discarded						[4] 12.1–23.7					
	Liquid from cooked samples						30.0–32.7					
	Liquid from canned samples						12.1–21.4					
	Fresh; average and range, 4 batches; England; dye titration.					80.4 32.1–118.1						200
	England; bradycardia method			210								11
	Cooked or canned; average and range; England; dye titration.						[2] 27 [2] 9–50					202
	Germany; dye titration:											
	Fresh					47.5						59
	Blanched						[4] 31.8					
	Dried						[2] 47.5					
	Dried						[4] 5.37					
	Germany; dye titration:											
	Fresh					24						279
	After 2 days in cool storage						13.0					
	After 3 days in cool storage						4.4					

Range, 5 samples; Germany; dye titration					11–52.7						279
Small leaf; Holland; dye titration:											
Fresh					**35**						137
Stored 1 day at 4° C						**29**					
Stored 5 days at 4° C						**5**					
Large leaf; Holland; dye titration:											
Fresh					**46**						137
Stored 1 day at 4° C						**43**					
Stored 5 days at 4° C						**8**					
Holland; dye titration:											
Fresh leaf					**60**						137
Held 1 day in ice box						**45**					
Held 5 days in ice box						**21**					
Held 1 day at room temperature						**49**					
Held 5 days at room temperature						**8**					
Grown in quartz sand; Holland; colorimetric and dye titration methods, respectively:											
With a balanced mineral solution	[1] 5,170				33						137
With a solution deficient in calcium	[1] *4,830*				*31*						
With a solution deficient in potassium	[1] *11,170*				*46*						
With a solution deficient in nitrogen	[1] *1,170*				*29*						
With a solution deficient in magnesium	[1] *5,670*				*31*						
Grown in sandy soil; Holland; colorimetric and dye titration methods, respectively:											
With no added fertilizer	[1] 4,330				71						137
With various combinations of organic nitrogen and phosphate.	[1] 4,330–15,830				*59–130*						
With no added fertilizer	[1] 6,170				56						
With various combinations of organic nitrogen and phosphate.	[1] 4,500–17,830				*58–116*						
With no added fertilizer	[1] 16,700				64						
With various combinations of organic nitrogen and potassium oxide.	[1] 7,500–20,700				*81–150*						
With no added fertilizer	[1] 16,500										
With various combinations of organic nitrogen and potassium oxide.	[1] 10,300–18,900					70–142					
Garden fresh; India; dye titration:											
Before the rains					36.9						211
After the rains					53.3						
Collected during dry, sunny weather; India; dye titration:											
Fresh					**36.9**						211
Held 24 hours at room temperature						**18.48**					
Held 2 days at room temperature						**8.86**					
Held 8 days at room temperature						**1.77**					

---

[1] International Unit values were calculated from carotene analyses or included carotene analyses.

[3] Values on cooked- or processed-weight basis.

[4] Values on raw-weight basis.

Vitamin values per 100 grams of edible portions of foods—Continued

Item (1)	Description of sample (2)	Vitamin A value (3a)	Vitamin A value (3b)	Thiamin (vitamin B_1) (4a)	Thiamin (vitamin B_1) (4b)	Ascorbic acid (vitamin C) (5a)	Ascorbic acid (vitamin C) (5b)	Vitamin D (6a)	Vitamin D (6b)	Riboflavin (7a)	Riboflavin (7b)	References (8)
		I. U.	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
Spinach—Continued.	Collected during wet, rainy season; India; dye titration:											
	Fresh					53.3						211
	Held 24 hours at room temperature						35.1					
	Held 2 days at room temperature						30.2					
	Held 8 days at room temperature						6.7					
	Garden fresh; India; dye titration:											
	From poorly manured garden					36.9						211
	From garden treated with farmyard manure					63.7						
	India; dye titration:											
	Fresh					123.9						226
	Stored for 24 hours at 5° C						100.4					
	Boiled, cooking water included						[2] 102.3					
	India; dye titration					31.5						1
	India; fluorometric method									89		291
	Leaves; Japan; modified dye titration					224						90
	2 determinations on same sample; Michigan; colorimetric methods.	[1] 6,500 [1] 6,170										20
	New Jersey; dye titration:											
	Raw; average and range, 10 lots					84.4 58.3–108.7						62
	Steam-cooked; average and range, 10 lots						[2] 56.3 [2] 29.4–74.2					
	Cooked in water; average and range, 10 lots						[2] 27.6 [2] 12.2–35.2					
	Frozen; average and range, 10 lots						[2] 46.9 [2] 24.2–59.6					
	Frozen; cooked in water; average and range, 10 lots.						[2] 28.5 [2] 20.3–41.6					
	Commercially canned; average and range, 6 lots.						[2] 27.5 [2] 22.9–31.7					
	Average and range, 12 autumn varieties grown on muck soil; New York; dye titration.					60 48–67						264
	Average and range, 11 autumn varieties grown on upland soil; New York; dye titration.					99 72–113						264

	Average and range, 12 spring varieties: New York dye titration:											
	Grown on muck soil					49 38-62						264
	Grown on upland soil					75 53-89						
	Norway; 1 sample:											
	Oxidation method									**495**		163
	Reduction method									**350**		
	Rat-growth method									**330**		
	Garden fresh; Ohio; dye titration					112.3						34
	Fresh; [Ohio]; dye titration					81.2						35
	Average, 22 samples; U. S. A.; dye titration					77						62
	U. S. A.; dye titration					45						21
	Wilted; U. S. A.; dye titration					*11.5*						21
	Market sample; U. S. A.; dye titration					49.2						34
	U. S. A.; rat-growth method			105								28
	2 determinations on same sample; U. S. A.; colorimetric methods.	[1] **8,670** [1] **9,000**										20
	do	[1] **6,830** [1] **7,330**										20
	do	[1] **7,000** [1] **6,830**										20
	U. S. A.; fluorometric method									159		126
	U. S. A.; dye titration					62						22
	Market; U. S. A.; dye titration					40						22
	Cooked; average for 21 samples; U. S. A.; dye titration.						[2] 40					62
Canned	Whole leaf; England; dye titration:											
	Immediately after commercial canning					[4] **17.7**						200
	After 20-week storage at room temperature						[4] **17.2**					
	After 40-week storage at room temperature						[4] **16.4**					
	[England]; thiochrome method			18								209
	Puree; England; dye titration:											
	Small pack:											
	Immediately after commercial canning					**41.9**						200
	After 1-week storage at room temperature						**42.3**					
	After 20-week storage at room temperature						**47.6**					
	After 40-week storage at room temperature						**42.8**					
	Large pack:											
	Immediately after commercial canning					**45.0**						
	After 1-week storage at room temperature						**45.9**					
	After 20-week storage at room temperature						**45.5**					
	After 40-week storage at room temperature						**41.8**					
	Average, 12 samples; U. S. A.; dye titration					28						62
	Average and range, 6 commercial samples; U. S. A.; dye titration.					27.5 22.9-31.7						62
	U. S. A.; dye titration					5						22
	U. S. A.; dye titration					9.5						21

---

[1] International Unit values were calculated from carotene analyses or included carotene analyses.

[2] Values on cooked- or processed-weight basis.

[4] Values on raw-weight basis.

Vitamin values per 100 grams of edible portions of foods—Continued

Item (1)	Description of sample (2)	Vitamin A value (3a)	Vitamin A value (3b)	Thiamin (vitamin B₁) (4a)	Thiamin (vitamin B₁) (4b)	Ascorbic acid (vitamin C) (5a)	Ascorbic acid (vitamin C) (5b)	Vitamin D (6a)	Vitamin D (6b)	Riboflavin (7a)	Riboflavin (7b)	References (8)
Spinach—Continued Canned—Con.	Commercial sample; strained and canned; U. S. A.; rat-growth methods:	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
	1932 samples	12, 600										109
	1933 samples	11, 700										
	1934 samples			16. 8								
	Commercial samples; strained; U. S. A.; dye titration:											
	In tin containers, 2 samples					2. 5 6. 7						199
	In glass container, 1 sample					6. 3						
	Commercial; strained; U. S. A.; dye titration:											
	Spring 1933					13. 2						108
	Spring 1934					9. 9						
	Spring 1935					10. 4						
	Autumn 1934					16. 7						
Dried	Germany; dye titration					47. 5						59
	do					32. 9						59
	Sweden; fluorometric method									80–100		67
	Dried at 50° C.; U. S. A.; rat-growth method:											
	Chopped raw and dried	**100, 000**										29
	Cooked, then dried	**203, 000**										
	Average, 3 samples; U. S. A.; dye titration					0						62
Frozen	Nobel; average and range; commercial; January–July; dye titration.					60 36–86						82
	Virginia Savoy; average and range; commercial sample; January–June; dye titration.					33 20–41						82
	Boston market; spectrographic method	[1] 30, 000										82
	Commercial samples; U. S. A.; rat-growth method:											
	Raw	[5] **4, 100**										29
	Cooked		[4] **10, 000**									
	Average, 9 samples; U. S. A.; dye titration					31						62
Various parts	Hollandia; New York; dye titration:											
	Leaves					79						265
	Stems					4						
	Prickly Winter; New York; dye titration:											
	Leaves					78						265
	Stems					6						
	Garden fresh; England; dye titration:											
	Small center leaves					107. 0						200
	Medium inner leaf, same plant					93. 9						
	Large outer leaf, same plant					68. 8						
	Stems, same plant					10. 0						
	Cotyledons; mixed sample; same plant					14. 4						

	Range, 4 samples; England; dye titration:											
	Leaf portions					32.1–60.0						200
	Stem portions					8.8–16.4						
	Flowers					26.8–60.0						
	Holland; dye titration:											
	Leaves					19						137
	Stalks					8						
	Stalks; India; dye titration					2.9						211
New Zealand	England; thiochrome method			63								210
	Leaves; Germany; modified dye titration					40						32
	New York; dye titration:											
	Freshly harvested					44						280
	After holding 2 weeks at 1°–3° C. after harvesting.						16					
	After holding 4 days at room temperature						21					
	New York; dye titration					28–59						280
	Ohio; dye titration:											
	Raw, garden fresh					25.5						34
	Cooked, liquid discarded						[2] 13.6					
	Cooked, liquid retained						[2] 21.7					
	U. S. A.; dye titration					19.2						146
Squash	Cymling; seeds and flesh; U. S. A.; rat-growth method.			42								28
	Hubbard; U. S. A.; dye titration					1.5						255
	Hubbard; U. S. A.; rat-growth method			48								28
	Hubbard; U. S. A.; fluorometric method									46		126
	Hubbard; cooked before commercial freezing; U. S. A.; rat-growth method.		[2]ca 6,000									29
	Hubbard; baked 50–60 minutes; average and range, 4 values; U. S. A.; dye titration.						[2] 7.0 [2]0.9–11.7					31
	Summer Crookneck; Washington, D. C., market; cooked; Maryland; rat-growth method.		[4] 700									29
	White Bush; U. S. A.; dye titration					23.2						34
	Zucchini; market sample; dye titration					23.7						34
	White; China; dye titration					12.31						41
	China; dye titration					5.55						41
	India; fluorometric method									65		291
	India; dye titration					2.5						1
	Summer; U. S. A.; fluorometric method									52		126
	Canned; commercial samples; U. S. A.; dye titration:											
	In tin containers, 2 samples						[2] 2 [2] 3					199
	In glass container, 1 sample						[2] 2.7					
Stomach	Hog; China; dye titration					15.30						41

---

[1] International Unit values were calculated from carotene analyses or included carotene analyses.
[2] Values on cooked- or processed-weight basis.
[4] Values on raw-weight basis.
[5] This figure may be significantly affected by method of sampling because of oxidative enzymes.

Vitamin values per 100 grams of edible portions of foods—Continued

Item (1)	Description of sample (2)	Vitamin A value (3a)	Vitamin A value (3b)	Thiamin (vitamin B$_1$) (4a)	Thiamin (vitamin B$_1$) (4b)	Ascorbic acid (vitamin C) (5a)	Ascorbic acid (vitamin C) (5b)	Vitamin D (6a)	Vitamin D (6b)	Riboflavin (7a)	Riboflavin (7b)	References (8)
		I. U.	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
Strawberry	Brenda Gautrez; average and range, 6 batches from 2 farms; England; dye titration.					56 52-61						201
	Clermont; freshly picked; Ohio; dye titration					142.9						34
	Evern; fully ripe; average and range, 7 batches from 3 farms; England; dye titration.					55 51-58						201
	Jucunda; fully ripe; average and range, 19 batches from 6 farms; England; dye titration.					62 50-83						201
	Jucunda; range for various stages of ripening; England; dye titration:											
	Green					*61-63*						201
	White					*72-80*						
	Half red, half white					*70-87*						
	Red, ripe					74-89						
	Klondike; Washington, D. C., market; Pennsylvania; rat-growth method.	ca 50										29
	Paxton; fully ripe; average and range, 5 batches from 2 farms; England; dye titration.					61 53-93						201
	Royal Sovereign; fully ripe; average and range, 17 batches from 8 farms; England; dye titration.					69 44-88						201
	1938 season; average and range, 10 samples; North Carolina; dye titration:											
	Fairmore					64.8 59.3-73.8						228
	Fairfax					55.0 47.5-64.5						
	Southland					49.1 45.3-53.0						
	Dorsett					45.3 39.7-49.2						
	Blakemore					42.6 35.4-53.3						
	Klondike					38.8 33.9-41.5						
	Missionary					36.2 29.4-48.1						

Denmark; dye titration:											
Fresh					63						138
Canned						[4]33					
Canned, stored 3 months at 15° C						[4]11					
Canned, stored 6 months at 15° C						[4]15					
Canned, stored 9 months at 15° C						[4]13					
Fresh; average and range, 8 batches; England; dye titration.					66.1 51.7–77.5						200
1 batch; England; dye titration:											
Fresh					71.4						200
After cooking in sirup, liquid included						[4]29.4					
After commercial canning in sirup, liquid included.						[4]45.2					
Average and range; England; dye titration					61 44–93						202
England; dye titration:											
Fresh					65						202
Made into jam						[2]22					
[England]; bradycardia method			Trace								13
England; dye titration:											
Raw					165.1						200
Immediately after commercial canning, sirup included.						[4]58.1					
Canned product stored 7 weeks at room temperature.						[4]44.9					
Canned product, stored 13 weeks at room temperature.						[4]36.9					
Raw					234.6						
Immediately after commercial canning, sirup included.						[4]45.2					
Canned product, stored 7 weeks at room temperature.						[4]34.5					
Canned product, stored 36 weeks at room temperature.						[4]33.3					
Raw					165.1						
Immediately after commercial canning in agitating cooker, sirup included.						[4]58.0					
Canned product, stored 7 weeks at room temperature.						[4]44.1					
Canned product, stored 35 weeks at room temperature.						[4]42.0					
Raw					152.1						
Immediately after bottling in sirup, liquid included.						[4]40.7					
Bottled product, stored 7 weeks at room temperature.						[4]33.9					
Bottled product, stored 36 weeks at room temperature.						[4]24.6					

Values on cooked- or processed-weight basis.

[4] Values on raw-weight basis.

Vitamin values per 100 grams of edible portions of foods—Continued

Item	Description of sample	Vitamin A value		Thiamin (vitamin B$_1$)		Ascorbic acid (vitamin C)		Vitamin D		Riboflavin		References
(1)	(2)	(3a)	(3b)	(4a)	(4b)	(5a)	(5b)	(6a)	(6b)	(7a)	(7b)	(8)
		I. U.	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
Strawberry—Continued.	Canned; [England]; thiochrome method				Nil							209
	Cooked or canned; average and range; England; dye titration.						[2]27 [2]19–35					202
	One sample; Europe:											
	Reduction method									180		163
	Rat-growth method									180		
	Average and range, 8 varieties; Germany; dye titration:											
	Fresh; 15 samples					74.0 43.9–98.1						229
	Stored 2 days at 2° C.; 8 samples						58.1 40.9–71.9					
	Fresh; Germany; dye titration					82.4						229
	Germany; dye titration:											
	Stored 3 days at −5° C						**40.9**					229
	Stored 10 days at −5° C						**17.1**					
	Germany; dye titration:											
	Fresh					**49.0**						59
	Canned in tin						[4] **37.9**					
	U. S. A.; dye titration					52						21
	U. S. A.; rat-growth method			<25								28
Frozen	Boston market sample; spectrographic method	[1]740										82
Juice	Commercial; pasteurized; England					[3]60						39
Various parts	Jucunda; England; dye titration:											
	Green berries:											
	Inner tissue					*39*						201
	Outer tissue					*60*						
	White berries:											
	Inner tissue					*47*						
	Outer tissue					*82*						
	Red berries:											
	Inner tissue					61						
	Outer tissue					118						
Suet:												
Beef	Washington, D. C., market sample; rat-growth method.	ca 600										29
Sugar beet (see Beet).												
Sunflower:												
Seeds	Salted; China; dye titration					[2]5.87						41
Sweetbread	Thiochrome method			39								209
	Fried; bradycardia method				[2]60–120							11

Sweetpotato	Jersey variety; U. S. A.; dye titration					32.6						34
	Nancy Hall; Maryland; rat-growth method:											
	Raw	3,800										29
	Cooked		[4] 3,460									
	Nancy Hall; U. S. A.; rat-growth method			93								28
	Porto Rico; unpared; average and range, 3 samples; Texas; dye titration.					20.3 15.4–25.9						85
	Prolific; Iowa; rat-growth method:											
	Grown on Buchner sand (deficient in N, P, K and organic matter).	2,520										252
	Muriate of potash added to sand	2,050										
	Manure added to sand	2,610										
	Sodium nitrate added to sand	1,960										
	Superphosphate added to sand	2,550										
	Average	2,340										
	China; dye titration					22.07						41
	[England]; thiochrome method			102								209
	India; fluorometric method									44		291
	U. S. A.; fluorometric method									70		126
	do									68		126
Various parts	India; dye titration:											
	Flesh					91.1						225
	Leaves					99.3						
	Skin					98.7						
Tamarind	India; dye titration					1.4						38
	do					2.6						211
Various parts	India; dye titration:											
	Flesh					13.5						225
	Skin					22.2						
Tangerine (see Citrus fruit).												
Tapioca	Dry; India; fluorometric method									417		195
	Thiochrome method			Nil								209
Tea leaves	Dried; dye titration					[2] 22						255
Tiger lily	Root; China; dye titration					16						41
Tomato:												
Red	All red; freshly picked; Minnesota; dye titration:											
	Grown in field					21.1						49
	Grown in greenhouse					11.3						
	Avon Early; average and range, 6 samples; Massachusetts; dye titration:											
	One strain					28 22–37						173
	Another strain					23 19–32						
	Baltimore; average and range, 6 samples; Massachusetts; dye titration.					26 23–33						
	Beauty; average and range, 6 samples; Massachusetts; dye titration.					23 22–24						

[1] International Unit values were calculated from carotene analyses or included carotene analyses.
[2] Values on cooked or processed-weight basis.
[3] Values per 100 ml.
[4] Values on raw-weight basis.

Vitamin values per 100 grams of edible portions of foods—Continued

Item	Description of sample	Vitamin A value		Thiamin (vitamin B₁)		Ascorbic acid (vitamin C)		Vitamin D		Riboflavin		References
(1)	(2)	(3a)	(3b)	(4a)	(4b)	(5a)	(5b)	(6a)	(6b)	(7a)	(7b)	(8)
Tomato—Con. Red—Continued.	Beauty; average and range, 3 samples; Massachusetts; dye titration:	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
	Hard green	--------	--------	--------	--------	22 16–25	--------	--------	--------	--------	--------	173
	Half ripe	--------	--------	--------	--------	24 22–35	--------	--------	--------	--------	--------	
	Fully ripe	--------	--------	--------	--------	23 22–24	--------	--------	--------	--------	--------	
	Belmont Improved; average and range, 6 samples; Massachusetts; dye titration.	--------	--------	--------	--------	27 20–35	--------	--------	--------	--------	--------	
	Best of All; average and range, 6 samples; Massachusetts; dye titration.	--------	--------	--------	--------	36 26–51	--------	--------	--------	--------	--------	
	Bison; grown in greenhouse, freshly picked; Minnesota; dye titration.	--------	--------	--------	--------	9.8	--------	--------	--------	--------	--------	49
	Bloomsdale; average and range, 6 samples; Massachusetts; dye titration.	--------	--------	--------	--------	24 18–31	--------	--------	--------	--------	--------	173
	Bonny Best; average and range, 8 strains; Massachusetts; dye titration.	--------	--------	--------	--------	29 25–34	--------	--------	--------	--------	--------	173
	Bonny Best; freshly picked; Minnesota; dye titration:											
	Grown in field	--------	--------	--------	--------	22.4	--------	--------	--------	--------	--------	49
	Grown in greenhouse	--------	--------	--------	--------	10.9	--------	--------	--------	--------	--------	
	Bonny Best; grown in greenhouse, freshly picked; Minnesota; dye titration.	--------	--------	--------	--------	11.0	--------	--------	--------	--------	--------	49
	Bonny Best; ground into pulp for sampling; Virginia; dye titration:											
	Mature:											
	Fresh; average and range	--------	--------	--------	--------	[3] 21 [3] 20–22	--------	--------	--------	--------	--------	
	Home-canned; processed 30 minutes cold pack in glass; average and range.	--------	--------	--------	--------	--------	[3] 20 [3] 17–22	--------	--------	--------	--------	
	Fresh; average and range	--------	--------	--------	--------	[3] 21 [3] 20–23	--------	--------	--------	--------	--------	
	Home-canned, processed 45 minutes cold pack in glass; average and range.	--------	--------	--------	--------	--------	[3] 21 [3] 19–23	--------	--------	--------	--------	
	Fresh; average	--------	--------	--------	--------	[3] 20	--------	--------	--------	--------	--------	
	Home canned, processed 60 minutes cold pack in glass; average.	--------	--------	--------	--------	--------	[3] 19	--------	--------	--------	--------	
	Fresh; average	--------	--------	--------	--------	[3] 20	--------	--------	--------	--------	--------	

Home-canned, processed 5 minutes hot pack in glass; average.	...	...	...	...	...	[3] 18	...	...	...	...	168
Slightly immature:											
Fresh; average and range	...	...	...	...	[3] 16 [3] 14–18	...	...	...	...	...	
Home-canned, processed 30 minutes cold pack in glass; average and range.	...	...	...	...	...	[3] 16 [3] 14–18	...	...	...	...	
Fresh; average and range	...	...	...	...	[3] 15 [3] 14–17	...	...	...	...	...	
Home-canned, processed 45 minutes cold pack process in glass; average and range.	...	...	...	...	...	[3] 15 [3] 14–17	...	...	...	...	
Fresh; average and range	...	...	...	...	[3] 14 [3] 11–19	...	...	...	...	...	
Home-canned, processed 60 minutes cold pack process in glass; average and range.	...	...	...	...	...	[3] 14 [3] 11–17	...	...	...	...	
Fresh; average and range	...	...	...	...	[3] 15 [3] 12–20	...	...	...	...	...	
Home-canned, processed 5 minutes hot pack in glass; average and range.	...	...	...	...	...	[3] 15 [3] 11–19	...	...	...	...	
Fresh; average and range	...	...	...	...	[3] 18 [3] 16–20	...	...	...	...	...	
Home-canned, processed 5 minutes hot pack in glass, stored 24 hours.	...	...	...	...	...	[3] 18 [3] 17–20	...	...	...	...	
Canned as above, stored 6 months at room temperature (70°–80° F.) on open shelves.	...	...	...	...	...	[3] 11 [3] 8–13	...	...	...	...	
Canned as above, stored 6 months in dark cupboard at room temperature.	...	...	...	...	...	[3] 10 [3] 9–12	...	...	...	...	
Immature:											
Fresh	...	...	...	...	[3] 16	...	...	...	...	...	
Home-canned, processed 30 minutes cold pack in glass.	...	...	...	...	...	[3] 15	...	...	...	...	
Fresh	...	...	...	...	[3] 15	...	...	...	...	...	
Home-canned, processed 45 minutes cold pack in glass.	...	...	...	...	...	[3] 16	...	...	...	...	
Fresh	...	...	...	...	[3] 13	...	...	...	...	...	
Home-canned, processed 60 minutes cold pack in glass.	...	...	...	...	...	[3] 13	...	...	...	...	
Fresh	...	...	...	...	[3] 16	...	...	...	...	...	
Home-canned, processed 5 minutes hot pack in glass.	...	...	...	...	...	[3] 15	...	...	...	...	
Break O'Day; average and range, 6 samples; Massachusetts; dye titration.	...	...	...	...	23 20–28	...	...	...	...	...	173
Brown's Special; average and range, 6 samples; Massachusetts; dye titration.	...	...	...	...	31 25–43	...	...	...	...	...	
Canadian; average and range, 6 samples; Massachusetts; dye titration.	...	...	...	...	21 17–24	...	...	...	...	...	

---

[3] Values per 100 ml.

Vitamin values per 100 grams of edible portions of foods—Continued

Item	Description of sample	Vitamin A value		Thiamin (vitamin B₁)		Ascorbic acid (vitamin C)		Vitamin D		Riboflavin		References
(1)	(2)	(3a)	(3b)	(4a)	(4b)	(5a)	(5b)	(6a)	(6b)	(7a)	(7b)	(8)
Tomato—Con. Red—Continued.	Clark's Early; average and range, 3 samples; Massachusetts; dye titration:	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
	Hard green	---	---	---	---	*22* *19–24*	---	---	---	---	---	173
	Half ripe	---	---	---	---	*26* *21–31*	---	---	---	---	---	
	Fully ripe	---	---	---	---	26 21–30	---	---	---	---	---	
	Chalk's Early Jewel; average and range, 6 samples; Massachusetts; dye titration:											
	One strain	---	---	---	---	29 19–40	---	---	---	---	---	173
	Another strain	---	---	---	---	28 26–33	---	---	---	---	---	
	Clark's Early Woodruff; average and range, 6 samples; Massachusetts; dye titration.	---	---	---	---	26 21–30	---	---	---	---	---	173
	Comet; average and range, 3 strains; Massachusetts; dye titration.	---	---	---	---	32 29–35	---	---	---	---	---	173
	Comet; average and range, 3 samples; Massachusetts; dye titration:											
	Hard green	---	---	---	---	*33* *27–39*	---	---	---	---	---	173
	Half ripe	---	---	---	---	*39* *30–45*	---	---	---	---	---	
	Fully ripe	---	---	---	---	35 33–37	---	---	---	---	---	
	Double Purpose; average and range, 6 samples; Massachusetts; dye titration.	---	---	---	---	29 24–44	---	---	---	---	---	173
	Earliana; average and range, 6 samples; Massachusetts; dye titration.	---	---	---	---	28 19–35	---	---	---	---	---	173
	Earliana; freshly picked; Minnesota; dye titration:											
	Grown in field	---	---	---	---	18.1	---	---	---	---	---	49
	Grown in greenhouse	---	---	---	---	10.4	---	---	---	---	---	
	Earliana; freshly picked; Minnesota; dye titration	---	---	---	---	23.8	---	---	---	---	---	49
	do	---	---	---	---	18.1	---	---	---	---	---	49
	Earliana; grown in greenhouse, freshly picked; Minnesota; dye titration.	---	---	---	---	10.3	---	---	---	---	---	49
	Early Baltimore; freshly picked; Minnesota; dye titration.	---	---	---	---	27.6	---	---	---	---	---	49

Early Stone; average and range, 6 samples; Massachusetts; dye titration.					33 27–41						173
Farthest North; freshly picked; Minnesota; dye titration.					17.1						49
Globe; average and range, 3 strains; Massachusetts; dye titration.					26 24–27						173
Glovel; freshly picked; Minnesota; dye titration					22.2						49
Grand Rapids Forcing; average and range, 6 samples; Massachusetts; dye titration.					25 21–35						173
Greater Baltimore; average and range, 6 samples; Massachusetts; dye titration.					30 24–38						173
Greenhouse; stored at room temperature; average and range, 4 samples; Massachusetts; dye titration:											
Two hours after picking					**44** **41–50**						173
Stored 48 hours						**37** **30–45**					
Stored 96 hours						**42** **38–52**					
Stored 168 hours						**34** **30–36**					
Stored 216 hours						**37** **25–51**					
Greenhouse Forcing; average and range, 6 samples; Massachusetts; dye titration.					31 22–37						173
Grothen; freshly picked; Minnesota; dye titration					23.1						49
Grothen's Globe; average and range, 6 samples; Massachusetts; dye titration.					23 16–33						173
Grothen's Red Globe; average and range, 6 samples; Massachusetts; dye titration.					23 15–29						173
Gulf State; freshly picked; Minnesota; dye titration.					26.2						49
Harkness; freshly picked; Minnesota; dye titration					18.0						49
Ideal Forcing; average and range, 6 samples; Massachusetts; dye titration.					39 30–47						173
Indiana Baltimore; average and range, 6 samples; Massachusetts; dye titration.					26 18–32						173
Italian Pink Plum; average and range, 6 samples; Massachusetts; dye titration.					22 15–30						173
Italian Red Pear; average and range, 6 samples; Massachusetts; dye titration.					29 18–45						173

Vitamin values per 100 grams of edible portions of foods—Continued

Item	Description of sample	Vitamin A value		Thiamin (vitamin B₁)		Ascorbic acid (vitamin C)		Vitamin D		Riboflavin		References
(1)	(2)	(3a)	(3b)	(4a)	(4b)	(5a)	(5b)	(6a)	(6b)	(7a)	(7b)	(8)
Tomato—Con. Red—Continued.	John Baer; average and range, 3 samples; Massachusetts; dye titration:	*I. U*	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
	Hard green					23 17–28						173
	Half ripe					28 18–35						
	Fully ripe					27 26–29						
	John Baer; average and range, 3 strains; Massachusetts; dye titration.					31 27–35						173
	Lang's Earliana; average and range, 6 samples; Massachusetts; dye titration.					32 18–46						173
	Lister's Protection; average and range, 6 samples; Massachusetts; dye titration.					29 23–42						173
	Louisiana Pink; fresh; average and range, 13 samples of firm, ripe fruit; North Carolina; dye titration.					23.4 16.5–29.0						295
	Marglobe; Iowa; grown on Webster loam; rat-growth method:											
	Fresh	**330**										253
	Commercially canned, stored 6 months		**[2] 620**									
	Commercially canned, stored 18 months		**[2] 600**									
	Commercially canned, stored 30 months		**[2] 540**									
	Commercially canned, stored 42 months		**[2] 600**									
	Marglobe; Maryland; rat-growth method	1,455										29
	Marglobe; average and range, 3 samples; Massachusetts; dye titration:											
	Fresh					**27** **24–30**						173
	Stored 20 hours at room temperature						**23** **16–28**					
	Stored 68 hours at room temperature						**25** **20–28**					
	Stored 92 hours at room temperature						**33** **24–41**					
	Stored 140 hours at room temperature						**23** **20–27**					
	Stored 240 hours at room temperature						**25** **19–32**					
	Marglobe; average and range, 9 strains; Massachusetts; dye titration.					27 22–31						
	Marglobe; freshly picked; Minnesota; dye titration:											

Grown in field	----	----	----	----	19.9	----	----	----	----	----	49
Grown in greenhouse	----	----	----	----	10.9	----	----	----	----	----	
Marglobe; freshly picked; Minnesota; dye titration.	----	----	----	----	23.6	----	----	----	----	----	49
----do	----	----	----	----	19.9	----	----	----	----	----	49
Marglobe; grown in greenhouse, freshly picked; Minnesota; dye titration.	----	----	----	----	11.0	----	----	----	----	----	49
Marglobe: fresh; average and range, 12 firm, ripe fruits; North Carolina; dye titration.	----	----	----	----	23.6 17.9–30.9	----	----	----	----	----	295
Marglobe; Washington, D. C., market; rat-growth method.	1,150	----	----	----	----	----	----	----	----	----	29
Marhio; average and range, 6 samples; Massachusetts; dye titration.	----	----	----	----	28 23–34	----	----	----	----	----	173
Massachusetts Field Station variety; average and range, 9 strains; Massachusetts; dye titration.	----	----	----	----	37 30–44	----	----	----	----	----	173
Master Marglobe; ripe, garden fresh; Ohio; dye titration.	----	----	----	----	55.8	----	----	----	----	----	34
Michigan State Forcing; average and range, 6 samples; Massachusetts; dye titration:											
One strain	----	----	----	----	26 20–39	----	----	----	----	----	173
Another strain	----	----	----	----	24 20–29	----	----	----	----	----	
Mingold; freshly picked; Minnesota; dye titration	----	----	----	----	21.0	----	----	----	----	----	49
New Stone; average and range, 6 samples; Massachusetts; dye titration.	----	----	----	----	30 21–37	----	----	----	----	----	173
New York State; average and range, 6 samples; Massachusetts; dye titration:											
One strain	----	----	----	----	26 19–32	----	----	----	----	----	
Another strain	----	----	----	----	21 17–30	----	----	----	----	----	
North Dakota variety; grown in greenhouse, freshly picked; Minnesota; dye titration.	----	----	----	----	11.3	----	----	----	----	----	49
Penn State; average and range, 6 samples; Massachusetts; dye titration.	----	----	----	----	18 15–26	----	----	----	----	----	173
Penn State; freshly picked; Minnesota; dye titration.	----	----	----	----	19.4	----	----	----	----	----	49
----do	----	----	----	----	17.1	----	----	----	----	----	49
Penn State Earliana; average and range, 6 samples; Massachusetts; dye titration:											
One strain	----	----	----	----	26 20–35	----	----	----	----	----	173
Another strain	----	----	----	----	22 17–26	----	----	----	----	----	
Princess of Wales; average and range, 6 samples; Massachusetts; dye titration.	----	----	----	----	41 30–59	----	----	----	----	----	
Pritchard; average and range, 3 strains; Massachusetts; dye titration.	----	----	----	----	21 13–27	----	----	----	----	----	
Pritchard; fresh; average and range, 12 firm, ripe fruits; North Carolina; dye titration.	----	----	----	----	22.0 14.8–25.8	----	----	----	----	----	295

---

[2] Values on cooked- or processed-weight basis.

Vitamin values per 100 grams of edible portions of foods—Continued

Item (1)	Description of sample (2)	Vitamin A value (3a)	Vitamin A value (3b)	Thiamin (vitamin B₁) (4a)	Thiamin (vitamin B₁) (4b)	Ascorbic acid (vitamin C) (5a)	Ascorbic acid (vitamin C) (5b)	Vitamin D (6a)	Vitamin D (6b)	Riboflavin (7a)	Riboflavin (7b)	References (8)
		I. U.	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
Tomato—Con. Red—Continued.	Red Cap; freshly picked; Minnesota; dye titration	----	----	----	----	18.7	----	----	----	----	----	49
	Red Cherry; average and range, 6 samples; Massachusetts; dye titration.	----	----	----	----	24 22-27	----	----	----	----	----	173
	Red Pear; average and range, 6 samples; Massachusetts; dye titration.	----	----	----	----	32 27-36	----	----	----	----	----	
	Red Plum; average and range, 6 samples; Massachusetts; dye titration.	----	----	----	----	31 29-33	----	----	----	----	----	
	Rosy Morn; average and range, 6 samples; Massachusetts; dye titration.	----	----	----	----	33 19-51	----	----	----	----	----	
	Rutgers; average and range, 5 strains; Massachusetts; dye titration.	----	----	----	----	25 22-29	----	----	----	----	----	
	Rutgers; freshly picked; Minnesota; dye titration	----	----	----	----	19.9	----	----	----	----	----	49
	Scarlet Dawn; average and range, 6 samples; Massachusetts; dye titration:											
	One strain	----	----	----	----	26 21-35	----	----	----	----	----	173
	Another strain	----	----	----	----	25 21-33	----	----	----	----	----	
	Scarlet Dawn; freshly picked; Minnesota; dye titration.	----	----	----	----	19.4	----	----	----	----	----	49
	Selected Earliana; average and range, 6 samples; Massachusetts; dye titration.	----	----	----	----	27 20-36	----	----	----	----	----	173
	Selection 16; freshly picked; Minnesota; dye titration:											
	Grown in field	----	----	----	----	18.8	----	----	----	----	----	49
	Grown in greenhouse	----	----	----	----	14.4	----	----	----	----	----	
	Small German Sugar; ripe, garden fresh; Ohio; dye titration.	----	----	----	----	72	----	----	----	----	----	34
	Sparke's Earliana; average and range, 6 samples; Massachusetts; dye titration.	----	----	----	----	32 24-44	----	----	----	----	----	173
	Special Earliana; average and range, 6 samples; Massachusetts; dye titration.	----	----	----	----	29 24-39	----	----	----	----	----	173
	Spring Garden; average and range, 6 samples; Massachusetts; dye titration.	----	----	----	----	28 19-46	----	----	----	----	----	173
	Stokesdale; garden fresh; Ohio; dye titration:											
	Ripe	----	----	----	----	36-57	----	----	----	----	----	34
	Green	----	----	----	----	*18.0*	----	----	----	----	----	

Stone; average and range; Maryland; dye titration:											
Fresh	----	----	----	----	**20** **17-22**	----	----	----	----	----	51
Canned in tin	----	----	----	----	----	**18** **14-21**	----	----	----	----	
Held 6 months at room temperature after canning.	----	----	----	----	----	**15** **14-17**	----	----	----	----	
Canned in glass; average and range	----	----	----	----	----	**16** **12-19**	----	----	----	----	
Held 6 months at room temperature after canning in glass.	----	----	----	----	----	**14** **12-15**	----	----	----	----	
Prepared as juice, canned in tin; average and range.	----	----	----	----	----	**18** **16-20**	----	----	----	----	
Prepared as juice, canned in tin: average and range after holding 6 months at room temperature.	----	----	----	----	----	**18** **15-18**	----	----	----	----	
Prepared as juice, canned in glass; average and range.	----	----	----	----	----	**16** **14-18**	----	----	----	----	
Prepared as juice, held 6 months at room temperature after canning in glass.	----	----	----	----	----	**11** **8-15**	----	----	----	----	
Stone; average and range, 3 samples; Massachusetts; dye titration:											
Hard green	----	----	----	----	*32* *27-38*	----	----	----	----	----	173
Half ripe	----	----	----	----	*26* *25-27*	----	----	----	----	----	
Fully ripe	----	----	----	----	29 24-40	----	----	----	----	----	
Stone; average and range, 4 strains; Massachusetts; dye titration.	----	----	----	----	29 26-31	----	----	----	----	----	
Success; average and range, 3 samples; Massachusetts; dye titration:											
Hard green	----	----	----	----	*33* *26-37*	----	----	----	----	----	
Half ripe	----	----	----	----	*26* *21-31*	----	----	----	----	----	
Fully ripe	----	----	----	----	26 21-29	----	----	----	----	----	
Success: average and range, 6 samples; Massachusetts; dye titration.	----	----	----	----	26 21-29	----	----	----	----	----	
Sunnybrook Earliana; average and range, 6 samples; Massachusetts; dye titration.	----	----	----	----	28 23-41	----	----	----	----	----	
Valiant; freshly picked; Minnesota dye titration	----	----	----	----	24.6	----	----	----	----	----	49
do	----	----	----	----	21.8	----	----	----	----	----	

Vitamin values per 100 grams of edible portions of foods—Continued

Item	Description of sample	Vitamin A value		Thiamin (vitamin B₁)		Ascorbic acid (vitamin C)		Vitamin D		Riboflavin		References
(1)	(2)	(3a)	(3b)	(4a)	(4b)	(5a)	(5b)	(6a)	(6b)	(7a)	(7b)	(8)
Tomato—Con. Red—Continued.	Average and range, whole tomato; grown on sandy loam, fertilized, picked nearly ripe, ripened 2 days in laboratory; North Carolina; dye titration:	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
	Pritchard					21.8 17.9–29.3						266
	Louisiana Pink					21.7 19.4–24.7						
	Greater Baltimore					17.9 16.5–21.5						
	Break-O'Day					17.6 15.7–19.4						
	Scarlet Dawn					17.6 14.7–22.7						
	Grothen					16.7 15.4–18.1						
	Louisiana Gulf State; overripened					16.6 13.8–18.8						
	Walter Richards					16.6 14.8–20.2						
	Marglobe					15.9 12.7–21.4						
	John Baer					14.8 14.2–15.5						
	Average for filtered juice of tomatoes; grown on sandy loam, fertilized, picked nearly ripe, ripened 2 days in laboratory; North Carolina; dye titration:											
	Pritchard					[3] 28.2						
	Louisiana Pink					[3] 31.3						
	Greater Baltimore					[3] 24.1						
	Break-O'Day					[3] 23.2						
	Scarlet Dawn					[3] 25.4						
	Grothen					[3] 22.8						
	Louisiana Gulf State					[3] 14.7						
	Walter Richards					[3] 23.4						
	Marglobe					[3] 23.2						
	John Baer					[3] 22.4						
	95–36; grown in greenhouse, freshly picked; Minnesota; dye titration.					10.8						49
	126–36; freshly picked; Minnesota; dye titration					18.5						49

126-36; grown in greenhouse, freshly picked; Minnesota; dye titration.	--------	--------	--------	--------	10.7	--------	--------	--------	--------	--------	49
138-36; freshly picked; Minnesota; dye titration	--------	--------	--------	--------	22.7	--------	--------	--------	--------	--------	49
138-36; grown in greenhouse, freshly picked; Minnesota; dye titration.	--------	--------	--------	--------	9.9	--------	--------	--------	--------	--------	49
15-37; grown in greenhouse, freshly picked; Minnesota; dye titration.	--------	--------	--------	--------	10.1	--------	--------	--------	--------	--------	49
16-37; freshly picked; Minnesota; dye titration	--------	--------	--------	--------	18.8	--------	--------	--------	--------	--------	49
16-37; grown in greenhouse, freshly picked; Minnesota; dye titration.	--------	--------	--------	--------	14.4	--------	--------	--------	--------	--------	49
17-37; grown in greenhouse, freshly picked; Minnesota; dye titration.	--------	--------	--------	--------	10.4	--------	--------	--------	--------	--------	49
47-37; freshly picked; Minnesota; dye titration	--------	--------	--------	--------	15.7	--------	--------	--------	--------	--------	49
48-37; freshly picked; Minnesota; dye titration	--------	--------	--------	--------	18.1	--------	--------	--------	--------	--------	49
114-37; freshly picked; Minnesota; dye titration	--------	--------	--------	--------	21.1	--------	--------	--------	--------	--------	49
Average and range; Argentina; dye titration	--------	--------	--------	--------	28 20-35	--------	--------	--------	--------	--------	216
Green; [England]; thiochrome method	--------	--------	*33*	--------	--------	--------	--------	--------	--------	--------	209
Ripe; [England]; thiochrome method	--------	--------	45	--------	--------	--------	--------	--------	--------	--------	209
Average and range; England; dye titration	--------	--------	--------	--------	24 12-42	--------	--------	--------	--------	--------	202
Pulp; England; bradycardia method	--------	--------	120	--------	--------	--------	--------	--------	--------	--------	11
Fiji; dye titration	--------	--------	--------	--------	21.6	--------	--------	--------	--------	--------	26
Juice; Fiji; dye titration	--------	--------	--------	--------	28.8	--------	--------	--------	--------	--------	26
France; thiochrome and lumiflavin methods, respectively:											
Partially ripe	--------	--------	*30*	--------	--------	--------	--------	--------	*10*	--------	83
Fully ripe	--------	--------	100	--------	--------	--------	--------	--------	50	--------	
Ripe; range, 8 samples from 2 varieties grown in field and in greenhouse; Germany; dye titration.	--------	--------	--------	--------	9.8-17.9	--------	--------	--------	--------	--------	229
Germany; dye titration:											
Fresh	--------	--------	--------	--------	**25.4**	--------	--------	--------	--------	--------	59
Canned in tin	--------	--------	--------	--------	--------	[4] **25.2**	--------	--------	--------	--------	
Fresh	--------	--------	--------	--------	**24.7**	--------	--------	--------	--------	--------	
Dried	--------	--------	--------	--------	--------	[2] **55.1**	--------	--------	--------	--------	
Dried	--------	--------	--------	--------	--------	[4] **10.2**	--------	--------	--------	--------	
Ripe; India; fluorometric method	--------	--------	--------	--------	--------	--------	--------	--------	236	--------	195
Green and fresh; India; fluorometric method	--------	--------	--------	--------	--------	--------	--------	--------	*195*	--------	195
India; fluorometric method	--------	--------	--------	--------	--------	--------	--------	--------	41	--------	291
India; dye titration	--------	--------	--------	--------	31.3	--------	--------	--------	--------	--------	211
Juice; India; dye titration	--------	--------	--------	--------	25.9	--------	--------	--------	--------	--------	1
Rumania; dye titration:											
Raw	--------	--------	--------	--------	16.5	--------	--------	--------	--------	--------	204
Cooked	--------	--------	--------	--------	--------	[2] 5.0	--------	--------	--------	--------	
Fresh; Sweden; fluorometric method	--------	--------	--------	--------	--------	--------	--------	--------	50	--------	67
Average and range, 5 samples; Texas; dye titration	--------	--------	--------	--------	17.9 10.6-28.2	--------	--------	--------	--------	--------	85
Average and range, 8 varieties; U. S. A.; dye titration.	--------	--------	--------	--------	22 16-31	--------	--------	--------	--------	--------	264

---

[2] Values on cooked- or processed-weight basis.

[3] Values per 100 ml.

[4] Values on raw-weight basis.

Vitamin values per 100 grams of edible portions of foods—Continued

Item (1)	Description of sample (2)	Vitamin A value (3a)	(3b)	Thiamin (vitamin B1) (4a)	(4b)	Ascorbic acid (vitamin C) (5a)	(5b)	Vitamin D (6a)	(6b)	Riboflavin (7a)	(7b)	References (8)
		I. U.	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
Tomato—Con. Red—Continued.	U. S. A.; dye titration:											
	Raw					**36**						34
	Cooked, liquid discarded						[2] **10.2**					
	Cooked, liquid retained						[2] **21.4**					
	Average and range; juice from raw tomato; U. S. A.; dye titration:											
	Fresh					[3] **16** [3] **15–16**						168
	Held in refrigerator 1 day at 40°–45° F						[3] **16** [3] **14–17**					
	Held in refrigerator 3 days at 40°–45° F						[3] **12** [3] **10–13**					
	U. S. A.; fluorometric method									52		126
	Juice, fresh; U. S. A.; dye titration					[3] 15.7						102
	Ripe; U. S. A.; rat-growth method									37.3		157
	Red; U. S. A.; rat-growth method			78								28
	Juice; U. S. A.; dye titration					23						22
	Average and range, 13 samples; Washington, D. C., market; dye titration.					[3] 18 13–21						50
Canned	Marglobe; juice; home-canned in tin, stored 8–9 months before testing; New York; dye titration:											
	Freshly opened					[3] **20.7**						117
	Opened and held 1 day in refrigerator						[3] **20.1**					
	Opened and held 3 days in refrigerator						[3] **17.5**					
	Opened and held 4 days in refrigerator						[3] **15.2**					
	Marglobe; juice; home-canned in glass, stored 8–9 months in dark before testing; New York; dye titration:											
	Freshly opened					[3] **9.8**						117
	Opened and held 1 day in refrigerator						[3] **8.9**					
	Opened and held 2 days in refrigerator						[3] **6.6**					
	Opened and held 4 days in refrigerator						[3] **3.7**					
	Marglobe; home-canned in tin, stored 8–9 months; New York; dye titration:											
	Juice from freshly opened tin					[3] **17.8**						117
	Opened and held 1 day in refrigerator						[3] **17.1**					
	Opened and held 4 days in refrigerator						[3] **16.5**					
	Marglobe; home-canned in glass, stored 8–9 months in dark; New York; dye titration:											
	Juice from freshly opened glass					[3] **8.7**						117
	Opened and held 1 day in refrigerator						[3] **7.6**					
	Opened and held 4 days in refrigerator						[3] **6.7**					

Home-canned; Connecticut; dye titration:											
Average and range, 4 samples; pressure cooker, 10 pounds for 15 minutes.					[3] 11.1 [3] 9.1–12.8						223
Average and range, 4 samples; open kettle, 20 minutes.					[3] 13.4 [3]11.5–15.4						
Average and range, 6 samples; hot water bath, 20–25 minutes.					[3] 16.7 [3]14.4–21.0						
Average and range, 8 samples; "conservo," 45 minutes.					[3] 13.3 [3]12.0–15.1						
Average and range, 17 samples; pressure cooker, 10 pounds for 5 minutes.					[3] 14.1 [3] 15–17.4						
Average and range, 35 samples; commercially canned; U. S. A.					[3] 13.7 [3] 7.3–17.4						
Average and range, 11 commercial samples; New York; dye titration.					[3] 21 [3] 15–25						50
Ripe red; commercially canned; average and range, 10 cans each of 6 brands; U. S. A.; dye titration.					[3] 18 [3] 13–22						167
Commercial samples; U. S. A.; dye titration:											
In tin containers; average and range, 3 samples					12.6 11–15						199
In glass containers; average and range, 4 samples.					15 11–19						
U. S. A.; dye titration					[3] 12						50
Commercial samples; strained and canned; U.S.A.; rat-growth methods:											
1932	4,640										109
1933	3,880		73.5								
1935			127.2								
Commercial samples; strained and canned; U. S. A.; dye titration:											
1933					13.7						108
1935					12.9						
Commercially canned juice; average and range, 12 cans each of 11 brands; U. S. A.; dye titration.					[3] 17 [3]8–26						167
Commercially canned juice; average and range; U. S. A.; dye titration:											
Freshly opened					[3] 18 [3] 14–23						168
Held in refrigerator 1 day at 40°–45°F						[3] 18 [3]14–23					
Held in refrigerator 5 days at 40°–45°F						[3]15 [3]12–18					
Juice pressed from commercially canned tomatoes; average and range; U. S. A.; dye titration:											
Freshly opened					[3] 20 [3] 20–21						168
Held in refrigerator 1 day at 40°–45°F						[3] 19 [3]18–19					
Held in refrigerator 4 days at 40°–45°F						[3] 11 [3]10–12					

---

[2] Values on cooked- or processed-weight basis.
[3] Values per 100 ml.

Vitamin values per 100 grams of edible portions of foods—Continued

Item (1)	Description of sample (2)	Vitamin A value (3a)	Vitamin A value (3b)	Thiamin (vitamin B_1) (4a)	Thiamin (vitamin B_1) (4b)	Ascorbic acid (vitamin C) (5a)	Ascorbic acid (vitamin C) (5b)	Vitamin D (6a)	Vitamin D (6b)	Riboflavin (7a)	Riboflavin (7b)	References (8)
Tomato—Con. Red—Continued. Canned—Con.												
	Commercially prepared juice; container completely filled; U. S. A.; dye titration:	*I. U*	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
	1 day after canning						**19.5**					262
	40 days after canning						**17.0**					
	230 days after canning						**16.5**					
	Commercially prepared juice; U. S. A.; dye titration:											
	Bottle completely filled, by hand:											
	Fresh juice					**21**						262
	1 day after bottling						**19**					
	40 days after bottling						**16.5**					
	230 days after bottling						**17.0**					
	Head space 2.5 cm.:											
	1 day after bottling					**17.0**						
	40 days after bottling						**14.5**					
	230 days after bottling						**15.0**					
	Head space 11.5 cm.:											
	1 day after bottling					**11.5**						
	40 days after bottling						**6.5**					
	230 days after bottling						**3.5**					
	Juice; commercial samples; U. S. A.; dye titration:											
	In tin containers; average and range, 6 samples.					10.2 8–16						199
	In glass containers; average and range, 5 samples.					10.6 10–15						
	Juice; average and range, 30 commercial samples; U. S. A.; dye titration.					19.1 12.0–32.0						10
	Commercially canned juice; average and range, 17 brands; U. S. A.; dye titration.					[3] 20 [3] 13–29						3
	Juice; commercial; New York grade C; dye titration.					[3] 20.7						266
	Juice; commercial; U. S. A.; dye titration					[3] 24.2						102
Various parts	India; dye titration:											
	Flesh					39						225
	Skin					57						
	Ripe; India; dye titration:											
	Whole fruit					32.2						211
	Juice					33.8						
Yellow	Golden Ball; New York; dye titration					21.3						146
	Golden Dwarf Champion; New York; dye titration.					20.6						146

	Golden Nugget; average and range, 6 samples; Massachusetts; dye titration.					43 31–50						173
	Golden Queen; average and range, 6 samples; Massachusetts; dye titration.					26 22–30						173
	Golden Queen; New York; dye titration					27.4						146
	Ripley; New York; dye titration					18.1						146
	Yellow Marigold; New York; dye titration					28.7						146
	Yellow Plum; New York; dye titration					22.9						146
	Yellow Plum; U. S. A.; dye titration					26.2						34
Tongue	Beef; U. S. A.; rat-growth and microbiological methods, respectively.			[7] 284						[7] 220		182;183
	Beef, cooked; thiochrome method				Nil							209
	Cooked; bradycardia method				[2] 90–135							13
	Hog; China; dye titration					6.55						41
Tree tomato	Yellow variety; India; dye titration					Nil						211
Tripe	Thiochrome method			6								209
	Stewed; bradycardia method				[2] <60							13
Trout	Muscle and skin, 81.0 percent moisture; Japan; lumiflavin method.									53.8		248
	Fresh-water; U. S. A.; rat-growth method			87								28
Tuna	Yellow fin; canned in cottonseed oil; Washington, D. C., market; rat-growth method.		[2] 200									29
	2 samples; back muscle; 70.2 and 72.2 percent moisture, respectively; lumiflavin method.									25.5 13.3		248
	Norway; rat-bioassay:											
	Ventral part, 19.6 percent fat							1,570				6
	Dorsal part, 6.2 percent fat							430				
Turbot	Fresh; Germany: chromatographic and colorimetric method.									136.7		233
	Back muscle; 76.6 percent moisture; Japan; lumiflavin method.									10.0		248
	Thiochrome method			18								209
Turnip	Shogoin; garden fresh; Ohio; dye titration					24.0						34
	Range; Boston market samples; spectrographic method.	[1] 0–40										82
	Short-shaped; China; dye titration					11.49						41
	Fresh; average, 4 batches; England; dye titration					26.1						200
	[England]; thiochrome method			33								209
	Cooked or canned; average and range; [England]; dye titration.						[2] 14 [2] 11–17					202
	Cooked; [England]; bradycardia method				Trace							11
	White; Fiji; dye titration					7.2						26
	India; fluorometric method									40		291
	India; dye titration					43.4						211
	do					28.0						1
	Average and range, 4 samples; Texas; dye titration					47.1 40.2–54.4						85

---

[1] International Unit values were calculated from carotene analyses or included carotene analyses.
[2] Values on cooked- or processed-weight basis.
[3] Values per 100 ml.
[4] Values on raw-weight basis.
[7] Values calculated from authors' data.

Vitamin values per 100 grams of edible portions of foods—Continued

Item	Description of sample	Vitamin A value		Thiamin (vitamin B$_1$)		Ascorbic acid (vitamin C)		Vitamin D		Riboflavin		References
(1)	(2)	(3a)	(3b)	(4a)	(4b)	(5a)	(5b)	(6a)	(6b)	(7a)	(7b)	(8)
		I. U.	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
Turnip—Con.	White fleshed; U. S. A.; rat-growth method			60								28
	U. S. A.; dye titration					38						196
	U. S. A.; fluorometric method									42		126
	Fresh juice; U. S. A.; dye titration					[3] 19.1						102
Various parts	India; dye titration:											
	Flesh					17.2						225
	Leaves					39.3						
	Skin					25.9						
Turnip greens	Shogoin; garden fresh; Ohio; dye titration:											
	Raw					**121.4**						34
	Cooked, liquid discarded						**[2] 73.0**					
	Cooked, liquid retained						**[2] 78.1**					
	[England]; thiochrome method			57								209
	Average and range, 5 samples; Texas; dye titration.					162.7 129–209.8						85
	U. S. A.; dye titration:											
	Average and range, 87 samples					**200.5** **67–422**						86
	Average, 87 samples of 2.5 gm. each; boiled						**[2] 7.5**					
	Average and range, 54 samples					**190** **125–302**						
	Average, 54 samples of 50 gm. each; boiled						**[2] 53**					
	U. S. A.; rat-growth method			138								28
	Washington, D. C., market; U. S. A.; rat-growth method:											
	Raw	**[5] 15,700**										29
	Cooked		**[4] 19,900**									
Turtle	Meat; China; dye titration					6.3						41
Veal	Lean; [Germany]; chromatographic and colorimetric method.									69.9–72.4		233
	Thiochrome method			171								209
	Cooked in pie; bradycardia method				[2] 150							11
	Hindquarter; U. S. A.; rat-growth and microbiological methods, respectively:											
	Fresh			**[7] 432**								182; 183
	Fried				**[4, 7] 240**						[4, 7] 352	
	Roasted				**[4, 7] 192**							
	Hindquarter; U. S. A.; rat-growth and microbiological methods, respectively.			[7] 122						240		182; 183
	Hindquarter; U. S. A.; microbiological method									240		183

Vinegar	Edible; Japan; lumiflavin method									2.36		249
Walnut	Persian; (English); U. S. A.; rat-growth method	ca 40										29
	do			342								28
	China; dye titration					20						41
	[England]; bradycardia method			450								11
Water coalthrop	Red; China; dye titration					17.1						41
Water cress	Average and range; England; dye titration					61 58–72						202
	England; bradycardia method			180								11
	Fresh; Ohio; dye titration					187.5						35
	Market sample; U. S. A.; dye titration					60.0						34
	U. S. A.; dye titration					54						22
Watermelon	Cletex; Texas; dye titration					8.6						85
	do					9.5						85
	Cuban Queen; average and range, 5 samples; Texas; dye titration.					6.5 5.1–7.8						85
	Dixie Queen (yellow meat); Texas; dye titration					4.3						85
	do					4.5						85
	Halbert Honey; Texas; dye titration					4.8						85
	do					7.0						85
	Irish Gray; Texas; dye titration:											
	(Yellow meat)					6.4						85
	(Red meat)					7.5						
	do					7.8						85
	Parker; average and range, 7 samples; Texas; dye titration.					5.5 3.7–6.9						85
	Stone Mountain; average and range, 4 samples; Texas; dye titration.					2.7 2.3–3.1						85
	Tom Watson; average and range, 7 samples; Texas; dye titration.					4.7 2.2–7.5						85
	Small; China; dye titration					7.12						41
	China; dye titration					5.73						41
	[England]; thiochrome method			69								210
	India; dye titration					< 1.0						1
	Center portion of fresh ripe fruit; Washington, D. C., market; U. S. A.; rat-growth method.	ca 500										29
	Freshly picked; western Australia; dye titration					5						123
	do					14						123
Rind	Pickled; U. S. A.; dye titration:											
	Flesh					[2] 1.01						44
	Juice					[2,3] 1.31						
	Preserved; U. S. A.; dye titration:											
	Flesh					[2] 0.0						44
	Juice					[2,3] 0.2						

---

[2] Values on cooked- or processed-weight basis.

[3] Values per 100 ml.

[4] Values on raw-weight basis.

[5] This figure may be significantly affected by method of sampling because of oxidative enzymes.

[7] Values calculated from authors' data.

Vitamin values per 100 grams of edible portions of foods—Continued

Item (1)	Description of sample (2)	Vitamin A value (3a)	Vitamin A value (3b)	Thiamin (vitamin B_1) (4a)	Thiamin (vitamin B_1) (4b)	Ascorbic acid (vitamin C) (5a)	Ascorbic acid (vitamin C) (5b)	Vitamin D (6a)	Vitamin D (6b)	Riboflavin (7a)	Riboflavin (7b)	References (8)
Watermelon—Con.		*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
Various parts	Dixie Belle; Georgia; dye titration:											
	Heart					7.14–10.80						44
	Red portion next rind					5.92–6.67						
	Black Gypsy; North Carolina; dye titration:											
	Heart					5.67–7.95						44
	Red portion next rind					4.99–5.55						
	Cannon Ball; North Carolina; dye titration:											
	Heart					7.97–9.88						44
	Red portion next rind					4.64–5.76						
	Cuban Queen; North Carolina; dye titration:											
	Heart					5.04–6.97						44
	Red portion next rind					4.67–4.23						
	Georgia Rattlesnake; North Carolina; dye titration:											
	Heart					7.28–13.70						44
	Red portion next rind					4.78–6.72						
	Irish Gray; North Carolina; dye titration:											
	Heart					6.82–8.64						44
	Red portion next rind					4.67–6.81						
	Kolb Gem; North Carolina; dye titration:											
	Heart					7.15–9.18						44
	Red portion next rind					6.11–5.97						
	Stone Mountain; North Carolina; dye titration:											
	Heart					8.76–10.19						44
	Red portion next rind					5.53–6.89						
	Thurmond Gray; North Carolina; dye titration:											
	Heart					6.77–9.85						44
	Red portion next rind					5.45–7.27						
	Tom Watson; North Carolina; dye titration:											
	Heart					8.43–10.25						44
	Red portion next rind					5.47–5.69						
	Tom Watson; South Carolina; dye titration:											
	Heart					5.79–6.95						44
	Red portion next rind					4.22–4.97						
	Seeds, fresh; China; dye titration					10.43						41
	Seeds, dried; China; dye titration						[2] 43.00					41
Whale flesh	Blue whale, from various regions; chemical method	210–340										273
	Finn whale, from various regions; chemical method	210–340										273
	Sperm whale; chemical method	2,500										273
Wheat:												
Bran	13 percent of whole wheat; fermentation method			1,600								234
	13.75 percent of whole wheat; fermentation method			1,330								234

	17 percent of whole wheat; fermentation method			1,320								234
	One sample:											
	Reduction method									**440**		163
	Oxidation method									**850**		
	Lumiflavin method									**120**		
	Bradycardia method			1,080								112
	"As milled"; bradycardia method			900								15
	China; dye titration					0						41
Flour: Miscellaneous	25 parts treated germ, 75 parts white flour; England; bradycardia method.			360								112
	do			390								112
	60 percent extraction of wheat; Germany			72								2
	Germ portion retained; U.S.A.; rat-growth method			129								28
	"Enriched"; Washington, D. C., market; rat-growth method.			470								(6)
	See also Wheat, Various milled products.											
White	Unbleached, refined white flour; south Hungary; chromatographic and spectroscopic methods.	[1] <0.16										296
	Calculated on 13 percent moisture basis; U. S. A.; fermentation method:											
	0.534 percent ash			270								127
	0.540 percent ash			340								
	0.563 percent ash			280								
	0.574 percent ash			200								
	0.615 percent ash			230								
	0.684 percent ash			310								
	0.698 percent ash			260								
	0.706 percent ash			300								
	0.710 percent ash			250								
	0.710 percent ash			310								
	0.712 percent ash			280								
	0.723 percent ash			260								
	0.727 percent ash			430								
	0.753 percent ash			440								
	0.754 percent ash			390								
	0.760 percent ash			360								
	0.764 percent ash			410								
	0.808 percent ash			470								
	Patent; U. S. A.; rat-growth method			ca 50								28
	From soft wheat; straight milled; U. S. A.; rat-growth method.			87								28
	Straight milled; unbleached; rat-growth method:											
	New			**111**								45
	After 9-12-month storage				**111**							
	After making into bread				**111**							
	Bleached with nitrogen dioxide				**111**							
	Bleached and stored 9-12 months				**111**							
	Bradycardia method			90								112
	do			60								112
	"Modern milled"; bradycardia method			45								15

---

[1] International Unit values were calculated from carotene analyses or included carotene analyses.

[2] Values on cooked- or processed-weight basis.

[6] Unpublished data, Bureau of Home Economics.

Vitamin values per 100 grams of edible portions of foods—Continued

Item	Description of sample	Vitamin A value		Thiamin (vitamin B₁)		Ascorbic acid (vitamin C)		Vitamin D		Riboflavin		References
(1)	(2)	(3a)	(3b)	(4a)	(4b)	(5a)	(5b)	(6a)	(6b)	(7a)	(7b)	(8)
Wheat—Continued. Flour—Continued.		*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
Whole [11]	Chiefkan; calculated on 10-percent moisture basis; 1.71 percent ash; Kansas; fermentation method.			720								127
	Tenmarq; calculated on 10-percent moisture basis; 1.51 percent ash; Kansas; fermentation method.			500								127
	Turkey; calculated on 10-percent moisture basis; 1.82 percent ash; Kansas; fermentation method.			670								127
	Durum N. W.; calculated on 10-percent moisture basis; 1.69 percent ash; fermentation method.			660								127
	English red, Little Joss and No. 1 Manitoba mixture; bradycardia method.			480								15
	Calculated on 10-percent moisture basis; Kansas; fermentation method:											
	1.71 percent ash			700								127
	1.88 percent ash			760								
	Calculated on 10-percent moisture basis; 1.79 percent ash; Maryland; fermentation method.			520								127
	Calculated on 10-percent moisture basis; New York State; fermentation method:											
	1.74 percent ash			680								127
	1.48 percent ash			520								
	1.78 percent ash			700								
	Calculated on 10 percent moisture basis; Northwestern; fermentation method:											
	1.79 percent ash			790								127
	1.65 percent ash			800								
	1.81 percent ash			650								
	Calculated on 10 percent moisture basis; 1.83 percent ash; Ohio; fermentation method.			640								127
	Calculated on 10 percent moisture basis; 1.66 percent ash; Oklahoma; fermentation method.			660								127
	Calculated on 10 percent moisture basis; Pacific coast; fermentation method:											
	1.61 percent ash			780								127
	1.53 percent ash			750								
	1.35 percent ash			600								
	1.56 percent ash			700								
	Calculated on 10 percent moisture basis; Southwestern; fermentation method:											
	1.80 percent ash			780								127
	1.46 percent ash			590								
	Calculated on 10 percent moisture basis; Texas; fermentation method:											

	1.60 percent ash			770								127
	1.75 percent ash			800								
	Commercial shipment; calculated on 10 percent moisture basis; U. S. A.; fermentation method:											
	1.75 percent ash			530								127
	1.75 percent ash			870								
	1.81 percent ash			790								
	1.78 percent ash			760								
	1.77 percent ash			820								
	1.81 percent ash			710								
	1.76 percent ash			670								
	1.84 percent ash			800								
	1.56 percent ash			670								
	1.77 percent ash			780								
	1.55 percent ash			770								
	1.58 percent ash			660								
	1.54 percent ash			690								
	1.77 percent ash			650								
	1.76 percent ash			670								
	1.51 percent ash			650								
	1.57 percent ash			660								
	1.55 percent ash			620								
	1.62 percent ash			660								
	1.74 percent ash			670								
	2.05 percent ash			640								
	1.58 percent ash			570								
	Average of 22 samples			690								
	U. S. A.; fermentation method:											
	Calculated on 10-percent moisture basis			**530**								127
	Bread, 38-percent moisture, made from the flour.				[2] **101**							
	Calculated on 10-percent moisture basis			**780**								
	Bread, 38-percent moisture, made from the flour.				[2] **143**							
	Calculated on 10-percent moisture basis			**650**								
	Bread, 38-percent moisture, made from the flour.				[2] **121**							
	Calculated on 10-percent moisture basis; 1.77 percent ash; Virginia; fermentation method.			670								127
	Rat-growth method:											
	Before making into bread			**354**								45
	After making into bread				**354**							
	Bradycardia method			450								112
	Stone ground; bradycardia method			495								15
Germ	Cleaned commercial samples; bradycardia method:											
	Range, 118 samples			**1,200–6,600**								12
	Peak of distribution, 118 samples			**3,900**								
	Range for 58 percent of the 118 samples			**3,000–4,800**								

---

[2] Values on cooked- or processed-weight basis.

[11] Samples under this category were designated as flour by the authors; in most cases values could probably have been designated as wheat, whole-grain.

Vitamin values per 100 grams of edible portions of foods—Continued

Item	Description of sample	Vitamin A value		Thiamin (vitamin B₁)		Ascorbic acid (vitamin C)		Vitamin D		Riboflavin		References
(1)	(2)	(3a)	(3b)	(4a)	(4b)	(5a)	(5b)	(6a)	(6b)	(7a)	(7b)	(8)
Wheat—Continued. Germ—Con.												
	Average and range, 9 samples:	*I. U*	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
	Bradycardia method			3,360 3,300–3,450								208
	Thiochrome method			2,100 1,860–2,580								
	Average and range, 8 samples:											
	Bradycardia method			3,690 3,600–3,750								208
	Thiochrome method			2,130 1,530–2,580								
	Average and range, 6 samples:											
	Bradycardia method			4,800 4,200–6,000								208
	Thiochrome method			2,010 1,770–2,430								
	Average and range, 5 samples:											
	Bradycardia method			3,000 2,850–3,150								208
	Thiochrome method			2,190 1,890–2,430								
	Crude; average and range, 5 samples; bradycardia method.			3,340 1,770–5,625								11
	Average and range, 4 samples; bradycardia method			2,295 1,800–2,880								112
	Average and range, 4 proprietary samples; bradycardia method.			4,440 4,275–4,500								11
	Range, 3 samples; U. S. A.; thiochrome method			2,000–3,000								120
	Average and range, 3 samples; thiochrome method			2,430 1,680–3,120								207

	U. S. A.; rat-curative method			2,010								147
	Commercial sample; U. S. A.; rat-growth method	ca 100										29
	U. S. A.; colorimetric method			3,100								179
	1 percent of whole-wheat berry; U. S. A.; fermentation method.			3,000								234
	Hand picked; general range; bradycardia method			3,300–4,500								15
	Commercial sample; some bran present; bradycardia method.			3,000								15
	Bradycardia method			3,900								15
Shredded	Biscuit; U. S. A.; rat-growth method			219								28
	U. S. A.; dye titration					0						43
Whole grain I [12]	American Banner; obtained from Michigan; fermentation method.			450								235
	April bearded; spring sowing; England; thiochrome method.			489								30
	Aring II; autumn sowing; England; thiochrome method.			399								30
	Atle; spring sowing; England; thiochrome method			420								30
	Baldrock; obtained from Michigan; fermentation method.			420								235
	Blackhull C. I. No. 6,251; obtained from Kansas; fermentation method.			520								235
	Blanka; spring sowing; England; thiochrome method.			438								30
	Blue Stem; thiochrome method			375								30
	Cheyenne C. I. No. 8,885; obtained from Kansas; fermentation method.			520								235
	Chiefkan C. I. No. 11,754; obtained from Kansas; fermentation method.			470								235
	Clarkan C. I. No. 8,858; obtained from Kansas; fermentation method.			670								235
	Desprez 80, (Joncquois) autumn sowing; England; thiochrome method:											
	Normal manuring			306								30
	Intensively manured			399								
	Fenland manuring			462								
	Early Blackhull C. I. No. 8,856; obtained from Kansas; fermentation method.			450								235
	Extra Kolben II; spring sowing; England; thiochrome method.			390								30
	Garnet; thiochrome method			384								30
	do			363								30
	Garnet; grade 1 C. W.; thiochrome method			294								30
	Holdfast; autumn sowing; England; thiochrome method.			432								30
	Hybrid 29; spring sowing; England; thiochrome method.			438								30
	Ironred; autumn sowing; England; thiochrome method.			345								30
	Kanred C. I. No. 5,146; obtained from Kansas; fermentation method.			500								235

---

[12] Wheats under this category are classified according to varieties.

Vitamin values per 100 grams of edible portions of foods—Continued

Item (1)	Description of sample (2)	Vitamin A value (3a)	Vitamin A value (3b)	Thiamin (vitamin B_1) (4a)	Thiamin (vitamin B_1) (4b)	Ascorbic acid (vitamin C) (5a)	Ascorbic acid (vitamin C) (5b)	Vitamin D (6a)	Vitamin D (6b)	Riboflavin (7a)	Riboflavin (7b)	References (8)
Wheat—Continued. Whole grain I[12]—Continued		*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
	Kawvale C. I. No. 8,180 (8,186?); obtained from Kansas; fermentation method.			450								235
	Kharkof C. I. No. 1,442; obtained from Kansas; fermentation method.			450								235
	Prolific; Maryland; rat-growth method	Nil										29
	Minturki; winter; obtained from Minnesota; fermentation method.			690								235
	Nebred C. I. No. 10,094; obtained from Kansas; fermentation method.			600								235
	Nittany; obtained from Michigan; fermentation method.			520								235
	Oro X Tenmarq C. I. No. 11,673; obtained from Kansas; fermentation method.			600								235
	Purkof; obtained from Michigan; fermentation method.			510								235
	Red Marvel; spring sowing; England; thiochrome method.			594								30
	Redman-Lincolnshire; 1939 crop; England; thiochrome method.			351								30
	Red Marvel; spring sowing; England; thiochrome method.			540								30
	Rivet; thiochrome method			165								30
	Scandia; autumn sowing; England; thiochrome method.			420								30
	Squareheads Master; autumn sowing; England; thiochrome method.			399								30
	Squareheads Master; autumn sowing; England; thiochrome method:											
	Normal manuring			429								30
	Intensively manured			234								
	Tenmarq C. I. No. 6,936; obtained from Kansas; fermentation method.			570								235
	Thatcher; spring; obtained from Minnesota; fermentation method.			730								235
	Trumbull; obtained from Michigan; fermentation method.			470								235
	Turkey C. I. No. 1,558; obtained from Kansas; fermentation method.			450								235
	Warden; autumn sowing; England; thiochrome method:											
	Normal manuring			375								30
	Intensively manured			429								

	Yeoman II; autumn sowing; England; thiochrome method:											
	Normal manuring			366								30
	Intensively manured			381								
	Fenland manuring			543								
	Yeoman-Lincolnshire; 1939 crop; England; thiochrome method.			252								30
	198 (20C); autumn sowing; England; thiochrome method.			426								30
	202 (47B); autumn sowing; England; thiochrome method:											
	Normal manuring			312								30
	Intensively manured			351								
	Fenland manuring			540								
Whole grain II [13]	Bahia Blanca; Argentina; bradycardia method			750								15
	Barusso Plate; Argentina; thiochrome method			393								30
	do			420								30
	Rosafe Plate; Argentina; bradycardia method			690								15
	Rosafe Plate; Argentina; thiochrome method			324								30
	do			276								30
	La Plata; Argentina; thiochrome method			420								288
	Durum; thiochrome method			999								30
	do			612								30
	Durum; grade 2; C. W. Amber; thiochrome method.			495								30
	Durum; Amber grade 3; thiochrome method			912								30
	Durum; No. 1 Amber; 11.9 percent protein; obtained from Illinois; fermentation method.			590								235
	Durum Mindum; spring; obtained from Minnesota; fermentation method.			710								235
	Durum, Red; 14.5 percent protein; obtained from Illinois; fermentation method.			630								235
	Karachi; India; thiochrome method			381								30
	White Karachi; India; thiochrome method			432								30
	do			420								30
	Manitoba; Canada; thiochrome method			550								288
	Manitoba; grade 1, Canada; thiochrome method			354								30
	do			381								30
	Manitoba; grade 2; Canada; thiochrome method			375								30
	Manitoba; grade 3; Canada; thiochrome method			162								30
	Manitoba; grade 4; Canada; thiochrome method			618								30
	do			354								30
	Red type; 1939 crop; England; thiochrome method			351								30
	Red (Native Red A); Holland; thiochrome method.			430								288
	Hard red spring; Montana; rat-growth method:											
	Ground			540								8
	Cracked, cooked in double boiler				[4] 525							
	Ground, baked into bread				[4] 465							

---

[4] Values on raw-weight basis.

[12] Wheats under this category are classified according to varieties.

[13] Wheats under this category are grouped by class or type and place of production.

Vitamin values per 100 grams of edible portions of foods—Continued

Item	Description of sample	Vitamin A value		Thiamin (vitamin B$_1$)		Ascorbic acid (vitamin C)		Vitamin D		Riboflavin		References
(1)	(2)	(3a)	(3b)	(4a)	(4b)	(5a)	(5b)	(6a)	(6b)	(7a)	(7b)	(8)
Wheat—Continued. Whole grain II[13]—Continued.		*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
	Hard spring; U. S. A.; rat-growth method			525								28
	Montana Spring; obtained from Illinois; fermentation method.			580								235
	Northern Spring; grade 1 dark; thiochrome method			180								30
	Spring, 13.5 percent protein; obtained from Illinois; fermentation method.			590								235
	Triticum dicoccum; England; thiochrome method			330								30
	T. dicoccum; France; thiochrome method			444								30
	T. durum; England; thiochrome method			540								30
	T. monococcum; England; thiochrome method			240								30
	T. monococcum; Russia; thiochrome method			351								30
	T. polonicum; Egyptian; thiochrome method			540								30
	T. polonicum; England; thiochrome method			417								30
	T. polonicum; Russia; thiochrome method			399								30
	T. spelta; England; thiochrome method			276								30
	T. spelta; Germany; thiochrome method			324								30
	T. vulgare; England; thiochrome method			294								30
	White; (native white); Holland; thiochrome method.			360								288
	White (No. 1 Hard White); 13.5 percent protein; obtained from Illinois; fermentation method.			610								235
	Soft White; Pacific; thiochrome method			441								30
	White type; 1939 crop; England; thiochrome method.			351								30
	White; 14.4 percent protein; obtained from Illinois; fermentation method.			610								235
	White; obtained from Illinois; fermentation method.			610								
	Dark Hard Red Winter; thiochrome method			462								30
	Hard Winter; U.S.A.; rat-growth method			477								28
	No. 1 Hard Winter; 14.5 percent protein; obtained from Illinois; fermentation method.			670								235
	Minnesota Winter; 11.6 percent protein; obtained from Illinois; fermentation method.			550								235
	Minnesota Winter; 13.5 percent protein; obtained from Illinois; fermentation method.			590								235
	Montana Winter; 15.0 percent protein; obtained from Illinois; fermentation method.			600								235
	Soft Winter; U.S.A.; rat-growth method			354								28
	East Africa; bradycardia method			540–600								15
	Australia; bradycardia method			780								15

do			540								15
do			630								15
Australia; thiochrome method			780								30
do			420								288
South Australia; thiochrome method			612								30
North-Southwest Australia; thiochrome method			450								30
West Australia; thiochrome method			606								30
Bulgaria; thiochrome method			384								30
California; thiochrome method			320								288
1938 crop; Danube region; thiochrome method			264								30
do			270								30
English grade 2; thiochrome method			312								30
English grade 3; thiochrome method			363								30
From Broadbalk field Rothamsted Experiment Station; England; bradycardia method:											
No manure on soil			300								159
Soil treated with 14 tons of dung per acre			360								
Soil treated with complete mineral mixture			390								
Above treatment plus 412 pounds ammonium sulfate per acre.			360								
Soil treated with 412 pounds ammonium sulfate per acre.			360								
1939 crop; Egypt; thiochrome method			462								30
France; thiochrome method			282								30
do			279								30
Germany			390								2
India; dye titration:											
Dry seeds					**2.6**						197
After 24-hour germination						**3.1**					
After 48-hour germination						**8.8**					
After 96-hour germination						**15.0**					
After 120-hour germination						**9.2**					
India; thiochrome method			225								30
India; fluorometric method									119		195
Ireland [Kilkenny District]; thiochrome method			354								30
Morrocco; thiochrome method			384								30
Palestine [lower Galilee]; thiochrome method			504								30
Palestine [plains of Sharon]; thiochrome method			453								30
Rumania; thiochrome method			480								288
do			225								30
do			180								30
Russia; thiochrome method			432								30
Sweden; fluorometric method									20		67
do									20		67
U. S. A.; fermentation method			570								234
do			625								234
U. S. A.; thiochrome method			420								120
Walla Walla; [U. S. A.]; thiochrome method			369								30
One sample; bradycardia method:											
Assayed in 1935			**480–720**								13
Assayed in 1936			**570–630**								

---

[13] Wheats under this category are grouped by class or type and place of production.

Vitamin values per 100 grams of edible portions of foods—Continued

Item	Description of sample	Vitamin A value		Thiamin (vitamin B₁)		Ascorbic acid (vitamin C)		Vitamin D		Riboflavin		References
(1)	(2)	(3a)	(3b)	(4a)	(4b)	(5a)	(5b)	(6a)	(6b)	(7a)	(7b)	(8)
		I. U	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
Wheat—Continued. Whole grain II[14]—Continued.	Bradycardia method			690								11
	do			780								11
	do			1,020								11
	do			360								15
	Thiochrome method			420								120
Various milled products.	U. S. A.; fermentation method:											
	Whole grain			570								234
	Germ portion; 1 percent of wheat			3,000								
	Bran portion; 17 percent of wheat			1,320								
	Shorts; 10 percent of wheat			2,300								
	Straight flour; 72 percent of wheat			150								
	Short patent flour; 80 percent of straight flour			70								
	First clear; 12 percent of straight flour			180								
	Second clear; 7 percent of straight flour			510								
	Selected 1 percent of low-grade flour			2,120								
	Whole grain			625								
	Bran portion; 13 percent of whole wheat			1,600								
	Middlings; 13 percent of whole wheat			2,800								
	Flour, low-grade; 7.1 percent of whole wheat			450								
	Flour; 64.2 percent of whole wheat			85								
	Ground screenings; 2.7 percent of whole wheat			640								
	Fermentation method:											
	Bran; 13.75 percent of whole wheat			1,330								234
	Wheat shorts; 13.75 percent of whole wheat			2,100								
	"Straight flour"; 72.5 percent of whole wheat			150								
	Short patent flour; 73 percent of straight flour			70								
	Clear; 23 percent of straight flour			270								
	Low-grade flour; 4 percent of straight flour			1,030								
	Long patent flour; best 90 percent of straight flour.			120								
	First middlings flour; 33 percent of short patent flour; U. S. A.; fermentation method.			30								234
	Third break; 3.5 percent of short patent flour; U. S. A.; fermentation method.			60								234
	Middlings; England; bradycardia method			1,350								112
	Semolina (purified middlings of durum wheat); bradycardia method.			105–135								13
	do			165–195								13
Whelk	China; dye titration					3.6						41

Whey:												
Dried	Washington; microbiological assay									2,970		47
	U. S. A.; microbiological method									2,300		242
	Open market; U. S. A.; microbiological assay									2,740		47
Whortleberry juice	Commercial; England; pasteurized					[3] 17						39
Yam	Elephant variety; India; dye titration					Nil						211
Yeast:												
Baker's	Ordinary moist baker's, 69.5 percent moisture; New York.			800						2,500		(14)
	Ordinary moist baker's, 70 percent moisture:											
	California			890						1,750		(15)
	Missouri			900						1,500		
	do			1,000						1,800		
	New Jersey			980						1,650		
	Moist high-vitamin-B$_1$, 69.7 percent moisture; New York.			20,000						2,500		(14)
	Moist high-vitamin-B$_1$, 70 percent moisture:											
	California			22,200						1,750		(15)
	Illinois			21,000						1,800		
	Missouri			22,000						1,650		
	New Jersey			22,500						1,500		
	Dried; New York			15,000						7,000		(14)
	do			36,000						7,000		(14)
	do			60,000						7,000		(14)
	Dried; New York; fermentation and microbiological methods, respectively.			2,700						7,000		(14)
	Dried, regular baker's, 3.5 percent moisture:											
	Missouri			3,000						5,000		(15)
	do			3,600						5,500		
	New Jersey			3,300						5,200		
	Dried, high-vitamin-B$_1$, 3.5 percent moisture:											
	Missouri			72,000						5,200		(15)
	do			65,000						5,500		
	New Jersey			68,000						5,000		
	do			66,000						5,600		
	Dried, irradiated; New York			60,000				720,000		7,000		(14)
Brewer's	Dried, debittered, 3.5 percent moisture:											
	England:											
	Rat-growth methods			**13,500**						**3,000**		(16)
	Thiochrome and microbiological methods, respectively.			**14,000**						**3,300**		
	Germany:											
	Rat-growth methods			**13,500**						**3,000**		
	Thiochrome and microbiological methods, respectively.			**15,000**						**3,700**		

---

[3] Values per 100 ml.

[14] Unpublished data from Charles N. Frey, The Fleischmann Laboratories, New York.

[15] Data supplied by K. L. Cartwright, Anheuser-Busch Laboratories, St. Louis,. All thiamin values were determined by 2 of the following 3 methods: Rat-growth, thiochrome and fermentation methods. Riboflavin was determined by 2 of 3 methods: Rat-growth, microbiological, and fluorophotometric methods.

[16] Data supplied by K. L. Cartwright, Anheuser-Busch Laboratories, St. Louis.

Vitamin values per 100 grams of edible portions of foods—Continued

Item (1)	Description of sample (2)	Vitamin A value (3a)	 (3b)	Thiamin (vitamin B_1) (4a)	 (4b)	Ascorbic acid (vitamin C) (5a)	 (5b)	Vitamin D (6a)	 (6b)	Riboflavin (7a)	 (7b)	References (8)
Yeast—Continued. Brewer's—Con.		*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
	Missouri:											
	Rat-growth methods	------	------	15,000	------	------	------	------	------	3,750	------	(16)
	Thiochrome and rat-growth methods, respectively.	------	------	15,200	------	------	------	------	------	3,800	------	
	Rat-growth methods	------	------	15,000	------	------	------	------	------	3,750	------	
	Thiochrome and microbiological methods, respectively.	------	------	15,500	------	------	------	------	------	3,970	------	
	Rat-growth methods	------	------	15,000	------	------	------	------	------	3,750	------	
	Thiochrome and microbiological methods, respectively.	------	------	15,350	------	------	------	------	------	3,900	------	
	Rat-growth methods	------	------	15,000	------	------	------	------	------	3,750	------	
	Thiochrome and microbiological methods, respectively.	------	------	20,100	------	------	------	------	------	4,820	------	
	New Jersey:											
	Rat-growth methods	------	------	15,000	------	------	------	------	------	3,750	------	
	Thiochrome and microbiological methods, respectively.	------	------	15,100	------	------	------	------	------	4,830	------	
	New York:											
	Rat-growth methods	------	------	15,000	------	------	------	------	------	3,750	------	
	Thiochrome and microbiological methods, respectively.	------	------	15,150	------	------	------	------	------	4,110	------	
	Washington:											
	Rat-growth methods	------	------	15,000	------	------	------	------	------	3,750	------	
	Thiochrome and microbiological methods, respectively.	------	------	14,900	------	------	------	------	------	3,700	------	
	Wisconsin:											
	Rat-growth methods	------	------	18,000	------	------	------	------	------	3,000	------	
	Thiochrome and microbiological methods, respectively.	------	------	19,500	------	------	------	------	------	3,100	------	
	Rat-growth methods	------	------	19,500	------	------	------	------	------	3,000	------	
	Thiochrome and microbiological methods, respectively.	------	------	20,100	------	------	------	------	------	3,300	------	
	Rat-growth methods	------	------	15,000	------	------	------	------	------	3,000	------	
	Thiochrome and microbiological methods, respectively.	------	------	16,900	------	------	------	------	------	3,250	------	

Dried, nondebittered, 3.5 percent moisture; rat-growth method:											
Missouri			13,500						3,500		(16)
do			12,000						4,000		
New Jersey			13,000						2,800		
Wisconsin			18,000						2,500		
Dried, nondebittered, 3.5 percent moisture; microbiological method:											
Missouri									3,500		(16)
do									3,900		
do									3,800		
do									4,400		
Dried; England; thiochrome method			3,900								207
Dried; England; bradycardia method			6,900								11
do			1,800								11
Dried; England; rat-growth method			10,500								45
Dried; India; fluorometric method									12,430		195
Dried; Japan; lumiflavin method									1,500		249
Dried, bottom yeast; Sweden; fluorometric method.									1,800– 2,100		67
Dried; average and range of values on same sample as determined by 5 laboratories; U. S. A.; bacteriological method.									6,110 4,700– 8,100		143
Dried; U. S. A.; thiochrome method			2,400								120
do			4,600								120
do			5,900								120
do			16,000								120
do			49,000								120
Dried; U. S. A.; colorimetric method			17,100								65
Dried; 1 sample; U. S. A.:											
Rat-growth method									6,150		272
Microbiological method									6,250		
U. S. A.; microbiological method:											
Debittered									3,690		242
Nondebittered									3,180		
Dried, recovered from alcohol production, 3.0 percent moisture; Pennsylvania:											
First sample:											
Rat-growth methods			1,800						>3,000		(16)
Thiochrome and microbiological methods, respectively.			1,800						2,500		
Second sample:											
Rat-growth methods			2,700						1,500		
Thiochrome and microbiological methods, respectively.			3,000						2,190		
Third sample:											
Rat-growth methods			2,400						1,500		
Thiochrome and microbiological methods, respectively.			2,400						1,210		

---

[16] Data supplied by K. L. Cartwright, Anheuser-Busch Laboratories, St. Louis.

Vitamin values per 100 grams of edible portions of foods—Continued

Item	Description of sample	Vitamin A value		Thiamin (vitamin B$_1$)		Ascorbic acid (vitamin C)		Vitamin D		Riboflavin		References
(1)	(2)	(3a)	(3b)	(4a)	(4b)	(5a)	(5b)	(6a)	(6b)	(7a)	(7b)	(8)
		I. U.	*I. U.*	*Mcg.*	*Mcg.*	*Mg.*	*Mg.*	*I. U.*	*I. U.*	*Mcg.*	*Mcg.*	
Yeast—Continued. Brewer's—Con.	Primary, nondebittered, 4-6 percent moisture; Missouri.			120						35-45		(15)
	Primary, debittered, 3-5 percent moisture; Missouri.			135-165						40-50		(15)
	Primary, for pharmaceutical uses, 3-5 percent moisture; Missouri.			180						70-80		(15)
	Primary, for fortification and flavoring of foods, 3-5 percent moisture; Missouri.			150-180						60-75		(15)
	Primary, high potency, 3-5 percent moisture; Missouri.			600-690						70-80		(15)
	Primary; range, 8 samples; U. S. A.; light absorption method.									3,420-7,820		236
	Residual, dried; 3 samples; U. S. A.:											
	Sample 1:											
	Microbiological method, 2 laboratories									**4,770** **4,635**		(16)
	Fluorophotometric method, 2 laboratories									**4,750** **4,710**		
	Rat-growth method, 1 laboratory									**4,700**		
	Sample 2:											
	Microbiological method, 2 laboratories									**3,660** **3,530**		(16)
	Fluorophotometric method, 2 laboratories									**3,450** **3,450**		
	Rat-growth method, 1 laboratory									**3,500**		
	Sample 3:											
	Microbiological method, 2 laboratories									**3,270** **3,210**		
	Fluorophotometric method, 2 laboratories									**3,450** **3,555**		
	Rat-growth method, 1 laboratory									**3,200**		
	Residual; range, 5 samples; U. S. A.; light absorption method.									3,420-6,020		236
Youngberry	Commercial frozen; Boston market sample; spectrographic method.	[1] 460										82

---

[1] International Unit values were calculated from carotene analyses or included carotene analyses.

[15] Data supplied by K. L. Cartwright, Anheuser-Busch Laboratories, St. Louis. All thiamin values were determined by 2 of the following 3 methods: Rat-growth, thiochrome, and fermentation methods. Riboflavin was determined by 2 of 3 methods: Rat-growth, microbiological, and fluorophotometric methods.

[16] Data supplied by K. L. Cartwright, Anheuser-Busch Laboratories.

LITERATURE CITED

(1) Ahmad, B.
1935. The vitamin C value of some common Indian fruits, vegetables and pulses by the chemical method. Indian Jour. Med. Res. 22: 789–799.

(2) American Medical Association.
1937. The vitamin content of flour and bread. Amer. Med. Assoc. Jour. 109: 1054–1055.

(3) ———
1938. The vitamin C content of commercially canned tomato juice and other fruit juices as determined by chemical titration. Amer. Med. Assoc. Jour. 110: 650–651.

(4) ———
1939. Accepted foods. Amer. Med. Assoc. Jour. 113: 129.

(5) Archibald, J. G., and Parsons, C. H.
1939. The effect of feeding a vitamin A supplement to dairy cattle. Mass. Agr. Expt. Sta. Bul. 357, 14 pp.

(6) Aschehoug, Valborg, Kringstad, Hans, and Lunde, Gulbrand.
1939. The vitamin D potency of different fish and fish products Soc. Chem. Indus. Jour. Trans. and Commun. 58: 220–223.

(7) Atkeson, F. W., Peterson, W. J., and Aldous, A. E.
1937. Observations on the carotene content of some typical pasture plants. Jour. Dairy Sci. 20: 557–562, illus.

(8) Aughey, Elizabeth, and Daniel, Esther Peterson.
1940. Effect of cooking upon the thiamin content of foods. Jour. Nutr. 19: 285–296.

(9) Bacharach, Alfred Louis, Cook, Phyllis Margaret, and Smith, Ernest Lester.
1934. The ascorbic acid content of certain citrous fruits and some manufactured citrous products. Biochem. Jour. 28: 1038–1047.

(10) Bailey, E. M.
1938. The forty-second report on food products and the thirtieth report on drug products. Conn. Agr. Expt. Sta. Bul. 415: 679–719.

(11) Baker, Audrey Zillah, and Wright, Margaret Davidson.
1935. The vitamin B_1 content of foods. Biochem. Jour. 29: 1802–1807, illus.

(12) ——— and Wright, M. D.
1937. Note on the variation in the vitamin B_1 activity of raw wheat germ. Jour. Hyg. [London] 37: 303–306, illus.

(13) ——— and Wright, Margaret Davidson.
1938. The vitamin B_1 content of foods. II. Additional values. Biochem. Jour. 32: 2156–2161, illus.

(14) ——— and Wright, Margaret D.
1939. A survey of the rat-bradycardia method of estimating vitamin B_1. Biochem. Jour. 33: 1370–1374, illus.

(15) ——— Wright, Margaret D., and Drummond, J. C.
1937. The nutritive value of bread. Soc. Chem. Indus. Jour. Trans. 56: 191T–194T.

(16) Bauman, C. A., Semb, J., Holmes, C. E., and Halpin, J. G.
1939. The determination of vitamin A in the hen's egg. Poultry Sci. 18: 48–53.

(17) Beacham, L. M., and Bonney, V. B.
1937. Ascorbic acid content of Florida citrus fruits. Assoc. Off. Agr. Chem. Jour. 20: 517–527.

(18) Bearse, Gordon E., and Miller, M. Wayne.
1937. The effect of varying levels of vitamin A in the hen ration on the vitamin A content of the egg yolk, on hatchability and on chick livability. Poultry Sci. 16: 39–43, illus.

(19) Bechtel, H. Ernest, and Hoppert, C. A.
1936. A study of the seasonal variation of vitamin D in normal cow's milk. Jour. Nutr. 11: 537–549, illus

(20) Benne, E. J., Wolman, W., Hibbard, R. P., and Miller, E. J.
1940. A COMPARISON OF THE PETERING-WOLMAN-HIBBARD PROCEDURE FOR DETERMINING CAROTENE, AND TWO MODIFICATIONS THEREOF WITH THE PETERSON-HUGHES-FREEMAN TECHNIC. Assoc. Off. Agr. Chem. Jour. 23: 709–716, illus.

(21) Bessey, Otto A.
1938. A METHOD FOR THE DETERMINATION OF SMALL QUANTITIES OF ASCORBIC ACID AND DEHYDROASCORBIC ACID IN TURBID AND COLORED SOLUTIONS IN THE PRESENCE OF OTHER REDUCING SUBSTANCES. Jour. Biol. Chem. 126: 771–784.

(22) ——— and King, C. G.
1933. THE DISTRIBUTION OF VITAMIN C IN PLANT AND ANIMAL TISSUES, AND ITS DETERMINATION. Jour. Biol. Chem. 103: 687–698.

(23) Bethke, R. M.; Record, P. R.; Wilder, O. H. M.; and Kick, C. H.
1936. EFFECT OF DIFFERENT SOURCES OF VITAMIN D ON THE LAYING BIRD. II. STORAGE OF VITAMIN D IN THE EGG AND CHICK AND MINERAL COMPOSITION OF THE MATURE EMBRYO. Poultry Sci. 15: 336–344.

(24) Birch, T. W., and Dann, W. J.
1933. ESTIMATION AND DISTRIBUTION OF ASCORBIC ACID (VITAMIN C) AND GLUTATHIONE IN ANIMAL TISSUES. Nature [London] 131: 469–470.

(25) Biswas, H. G., and Das, K. L.
1939. VITAMIN-C CONTENT OF THE CHILLIES, ONION, AND GARLIC, BOTH IN THE RAW STATE AND WHEN BOILED WITH WATER. Indian Jour. Med. Res. 27: 135–138.

(26) Blackie, W. J.
1940. THE VITAMIN C VALUES OF SOME FIJI FRUITS AND VEGETABLES. Fiji Dept. Agr., Agr. Jour. 11: 5–6.

(27) ——— and Cowgill, George R.
1939. OCCURRENCE OF CAROTENE IN THE OIL OF ATTALEA GOMPHOCOCCA MART, AND ITS RELATION TO VITAMIN A POTENCY. Food Res. 4: 129–133.

(28) Booher, Lela E., and Hartzler, Eva R.
1939. THE VITAMIN B_1 CONTENT OF FOODS IN TERMS OF CRYSTALLINE THIAMIN. U. S. Dept. Agr. Tech. Bul. 707, 20 pp, illus.

(29) ——— and Marsh, Rosemary Loughlin.
1941. THE VITAMIN A VALUES OF 128 FOODS AS DETERMINED BY THE RAT-GROWTH METHOD. U. S. Dept. Agr. Tech. Bul. 802, 30 pp., illus.

(30) Booth, R. G.
1940. THE THIOCHROME METHOD FOR THE ESTIMATION OF ANEURIN, WITH A SURVEY OF THE ANEURIN CONTENT OF WHEATS. Soc. Chem. Indus. Jour. Trans. and Commun. 59: 181–184, illus.

(31) Bryan, A. Hughes, Turner, Dorothea, Lotwin, Gertrude, and Huenemann, Ruth L.
1940. THE ESTIMATION OF THE ASCORBIC ACID CONTENT OF THE DIET. Amer. Dietet. Assoc. Jour. 16: 891–897.

(32) Bukatsch, Franz.
1939. EINE NEUE METHODE ZUR BESTIMMUNG DES C-VITAMINS MIT DEM STUFENPHOTOMETER VON ZEISS. Hoppe-Seylers Ztschr. f. Physiol. Chem. 262: 20–28, illus.

(33) Burrell, R. C., Brown, H. D., and Ebright, Virginia R.
1940. ASCORBIC ACID CONTENT OF CABBAGE AS INFLUENCED BY VARIETY, SEASON, AND SOIL FERTILITY. Food Res. 5: 247–252.

(34) ——— and Ebright, Virginia R.
1940. THE VITAMIN C CONTENT OF FRUITS AND VEGETABLES. Chem. Ed. Jour. 17: 180–182.

(35) ——— and Miller, Helena A.
1939. THE VITAMIN C CONTENT OF SPRING GREENS. Science 90: 164–165.

(36) Buxton, Loran O.
1939. CAROTENOIDS IN YELLOW CORN. Indus. and Engin. Chem., Analyt. Ed. 11: 128–129, illus.

(37) Campion, John Edward, Henry, Kathleen Mary, Kon, Stanislaw Kazimierz, and Mackintosh, James.
1937. THE SOURCE OF VITAMIN D IN SUMMER MILK. Biochem. Jour. 31: 81–88, illus.

(38) Chakraborty, R. K.
1935. THE VITAMIN C CONTENT OF SOME INDIAN FOOD-MATERIALS. Indian Jour. Med. Res. 23: 347–351.

(39) Charley, Vernon L. S.
1938. A GENERAL REPORT ON FRUIT BEVERAGES. Food 8: [44]–46.

(40) Chu, Fu-Tang, and Sung, Chieh.
1936. EFFECT OF VITAMIN C ADMINISTRATION ON VITAMIN C OF MILK AND URINE OF LACTATING MOTHERS. Soc. Expt. Biol. and Med. Proc. 35: 171–172.

(41) Chu, T. J., and Read, B. E.
1938. THE VITAMIN C CONTENT OF CHINESE FOODS. PART II. Chinese Jour. Physiol. 13: 247–255.

(42) Clague, J. A., Fellers, C. R., and Stepat, Walter.
1936. VITAMIN C CONTENT OF RAW, COOKED, AND CANNED RHUBARB. Amer. Soc. Hort. Sci. Proc. (1935) 33: 624–626.

(43) Clayton, Mary M., and Folsom, Marie T.
1940. A METHOD FOR THE STUDY OF THE AVAILABILITY FOR HUMAN NUTRITION OF THE VITAMIN C IN FOODS, WITH AN APPLICATION TO THE STUDY OF THE POTATO. Jour. Home Econ. 32: 390–395, illus.

(44) Clegg, R. E., and Satterfield, G. Howard.
1940. THE VITAMIN C (ASCORBIC ACID) CONTENT OF TEN VARIETIES OF WATERMELONS. Amer. Dietet. Assoc. Jour. 16: 39–42.

(45) Copping, Alice Mary, and Roscoe, Margaret Honora.
1937. THE WATER-SOLUBLE B-VITAMINS IN YEAST, FLOUR, AND BREAD. Biochem. Jour. 31: 1879–1902.

(46) Coward, Katharine H., and Morgan, Barbara G. E.
1935. QUANTITATIVE ESTIMATION OF VITAMINS A AND D IN VARIOUS FOOD SUBSTANCES COOKED AND FRESH. Brit. Med. Jour. 2: 1041–1044.

(47) Culton, Thos. G., and Bird, H. R.
1940. THE EFFECT OF SOME RIBOFLAVIN SUPPLEMENTS ON CHICK GROWTH AND CURLED-TOE PARALYSIS. Poultry Sci. 19: 424–430, illus.

(48) Curran, Katherine M., Tressler, Donald K., and King, Charles G.
1937. LOSSES OF VITAMIN C DURING COOKING OF NORTHERN SPY APPLES. Food Res. 2: 549–557, illus.

(49) Currence, T. M.
1940. A COMPARISON OF TOMATO VARIETIES FOR VITAMIN C CONTENT. Amer. Soc. Hort. Sci. Proc. (1937) 37: 901–904.

(50) Daniel, Esther Peterson, Kennedy, Mary H., and Munsell, Hazel E.
1936. RELATIVE VITAMIN C CONTENT OF ORANGE AND TOMATO JUICES DETERMINED CHEMICALLY AND BIOLOGICALLY. Jour. Home Econ. 28: 470–474.

(51) ——— and Rutherford, Marjorie B.
1936. EFFECT OF HOME CANNING AND STORAGE ON ASCORBIC ACID CONTENT OF TOMATOES. Food Res. 1: 341–347.

(52) ——— and Rutherford, Marjorie B.
1937. ASCORBIC ACID CONTENT OF A NUMBER OF CITRUS FRUITS. Jour. Agr. Res. 54: 689–693.

(53) Davies, Alan William, and Moore, Thomas.
1939. THE VITAMIN A CONTENT OF CHEESE. Biochem. Jour. 33: 1645–1647.

(54) De Caro, L., and Locatelli, A.
1938. SUL CONTENUTO IN VITAMINE A, B_1, B_2, E C DELLE PATATE CRUDE E COTTE. Quaderni della Nutr. 5: 11–20, illus.

(55) DeVaney, Grace M., and Munsell, Hazel E.
1935. VITAMIN D CONTENT OF CALF, BEEF, LAMB, AND HOG LIVER. Jour. Home Econ. 27: 240–241.

(56) ——— Munsell, Hazel E., and Titus, Harry W.
1936. FURTHER STUDIES ON THE EFFECT OF SOURCES OF VITAMIN D IN THE DIET OF THE CHICKEN ON STORAGE OF THE ANTIRACHITIC FACTOR. Poultry Sci. 15: 149–153.

(57) DeVaney, Grace M., and Putney, Lydia K.
1935. THE VITAMIN A AND D CONTENT OF CANNED SALMON. Jour. Home Econ. 27: 658–662.

(58) DeWitt, James B., and Sure, Barnett.
1938. A STUDY OF CERTAIN REDUCING SUBSTANCES IN CITRUS FRUITS. Food Res. 3: 351–358.

(59) Diemair, W., Timmling, E., and Fox, Frankfurt H.
1939. ÜBER DEN VITAMIN C-GEHALT VON GEMÜSE-UND OBSTKONSERVEN. Vorratspflege u. Lebensmtl. Forsch. 2: 152–160.

(60) Dornbush, A. C., Peterson, W. H., and Olson, F. R.
1940. THE CAROTENE AND VITAMIN A CONTENT OF MARKET MILKS. Amer. Med. Assoc. Jour. 114: 1748–1751, illus.

(61) Drummond, J. C., Gray, C. H., and Richardson, N. E. G.
1939. THE ANTIRACHITIC VALUE OF HUMAN MILK. Brit. Med. Jour. 4110: 757–760.

(62) Dunker, C. F., and Fellers, C. R.
1939. VITAMIN C CONTENT OF SPINACH. Amer. Soc. Hort. Sci. Proc. (1938) 36: 500–504.

(63) ——— Fellers, C. R., and Fitzgerald, G. A.
1937. STABILITY OF VITAMIN C IN SWEET CORN TO SHIPPING, FREEZING, AND CANNING. Food. Res. 2: 41–50, illus.

(64) Edisbury, Joseph Ratcliffe, Lovern, John Arnold, and Morton, Richard Alan.
1937. DISTRIBUTION OF VITAMIN A IN THE TISSUES OF THE EELS ANGUILLA VULGARIS AND A. AUCKLANDI RICH. Biochem. Jour. 31: 416–423.

(65) Emmett, A. D., Peacock, Gail, and Brown, Raymond A.
1940. CHEMICAL DETERMINATION OF THIAMINE BY A MODIFICATION OF THE MELNICK-FIELD METHOD. Jour. Biol. Chem. 135: 131–138, illus.

(66) Engel, R. W., Phillips, P. H., and Halpin, James G.
1940. THE EFFECT OF A RIBOFLAVIN DEFICIENCY IN THE HEN UPON EMBRYONIC DEVELOPMENT OF THE CHICK. Poultry Sci. 19: 135–142, illus.

(67) Euler, Hans V., Adler, Erich, and Schlötzer, Arnulf.
1934. VERBREITUNG DES GEBUNDENEN UND DES FREIEN FLAVINS IN PFLANZEN. Hoppe-Seylers Ztschr. f. Physiol. Chem. 226: 87–94.

(68) Everson, Gladys J., and Daniels, Amy L.
1936. VITAMIN C STUDIES WITH CHILDREN OF PRESCHOOL AGE. Jour. Nutr. 12: 15–26, illus.

(69) Falke, Berthold, and Lemmel, Gerhard.
1939. VITAMINISIERUNG VON NAHRUNGSMITTELN. Ernährung 4: 317–325.

(70) Fawns, H. T.
1939. THE PHOTOCHEMICAL DECOMPOSITION OF ASCORBIC ACID IN BLACK-CURRANT SYRUP. Soc. Chem. Indus. Jour. Trans. and Commun. 58: 193–194.

(71) Fellers, Carl R.
1935. VITAMIN CONTENT OF IMPORTANT FOODS IN THE CHILD'S DIET. Amer. Jour. Pub. Health 25: 1340–1345.

(72) ——— Esselen, W. B., Jr., and Fitzgerald, G. A.
1940. VITAMIN B_1 AND VITAMIN B_2 (G) CONTENT OF VEGETABLES AS INFLUENCED BY QUICK-FREEZING AND CANNING. Food Res. 5: 495–502.

(73) ——— and Harris, Sterling G.
1940. CANNED ATLANTIC CRAB MEAT. A NEW AMERICAN FOOD. Indus. and Engin. Chem., Indus. Ed. 32: 592–594, illus.

(74) ——— and Smith, G. G.
1934. VITAMINS C AND A IN MAPLE PRODUCTS. Amer. Soc. Hort. Sci. Proc. 31: 96–97, illus.

(75) ——— and Stepat, Walter.
1936. EFFECT OF SHIPPING, FREEZING, AND CANNING ON THE ASCORBIC ACID (VITAMIN C) CONTENT OF PEAS. Amer. Soc. Hort. Sci. Proc. (1935) 33: 627–633, illus.

(76) Fenton, Faith, and Tressler, D. K.
1938. losses of vitamin c during commercial freezing, defrosting, and cooking of frosted peas. Food Res. 3: 409–416.

(77) ——— and Tressler, D. K.
1938. losses of vitamin c during the cooking of certain vegetables. Jour. Home Econ. 30: 717–722.

(78) ——— Tressler, Donald K., Camp, S. C., and King, C. G.
1937. losses of vitamin c during the cooking of swiss chard. Jour. Nutr. 14: 631–640, illus.

(79) ——— Tressler, Donald K., Camp, S. C., and King, C. G.
1938. losses of vitamin c during boiling and steaming of carrots. Food. Res. 3: 403–408.

(80) ———Tressler, Donald K., and King, Charles G.
1936. losses of vitamin c during the cooking of peas. Jour. Nutr. 12: 285–295, illus.

(81) Fincke, Margaret L.
1939. vitamin values of garden-type peas preserved by frozen-pack method. iii. thiamin (vitamin B_1). Food Res. 4: 605–611.

(82) Fitzgerald, G. A., and Fellers, C. R.
1938. carotene and ascorbic acid content of fresh market and commercially frozen fruits and vegetables. Food Res. 3: 109–120.

(83) Flavier, H., and Genevois, L.
1939. dosage des vitamines B_1 et B_2 dans les tissus vegetaux. Soc. de Biol. [Paris] Compt. Rend. 130: 497–499.

(84) ——— and Genevois, L.
1939. evolution des vitamines B_1 et B_2 au cours de la maturation du raisin et de la fermentation alcoolique. Soc. de Biol. [Paris] Compt. Rend. 130: 499–500.

(85) Floyd W. W., and Fraps, G. S.
1939. vitamin c content of some texas fruits and vegetables. Food Res. 4: 87–91.

(86) ——— and Fraps, G. S.
1940. changes in vitamin c content during boiling of turnip greens in various waters in covered and uncovered containers. Food Res. 5: 33–41.

(87) Fox, F. William, and Stone, William.
1937. specificity of indophenol in the estimation of ascorbic acid in fermented products. Nature [London] 140: 234.

(88) Fraps, G. S. and Kemmerer, A. R.
1939. improved method for estimating carotene in feeds. Assoc. Off. Agr. Chem. Jour. 22: 190–195.

(89) French, R. B., and Abbott, O. D.
1940. investigation of the vitamin c content of florida fruits and vegetables. i. effects of maturation and of cold storage on the vitamin c potency of oranges and grapefruit. Jour. Nutr. 19: 223–232, illus.

(90) Fujita, Akiji, and Ebihara, Tsutomu.
1939. über die kolorimetrische bestimmung des vitamins c. Biochem. Ztschr. 300: 136–142.

(91) ——— and Ebihara, Tsutomu.
1939. über die verteilung des vitamins c in tierischen und pflanzlichen geweben. ii. Biochem. Ztschr. 300: 143–147.

(92) Garrett, O. F., Arnold, R. B., and Hartman, G. H.
1940. some factors affecting certain milk properties. iii. effect of roughages on ascorbic acid. Jour. Dairy Sci. 23: 47–52, illus.

(93) Gillam, Albert Edward
1934. a modified spectrophotometric method for the assay of carotene and vitamin a in butter. Biochem. Jour. 28: [79]–83.

(94) ———
1938. the vitamin A_1 and A_2 contents of mammalian and other animal livers. Biochem. Jour. 32: 1496–1500.

(95) Gillam, Albert Edward and Heilbron, Isidor Morris, Ferguson, William Swan, and Watson, Stephen John.
1936. VARIATIONS IN THE CAROTENE AND VITAMIN A VALUES OF THE MILK FAT (BUTTER) OF CATTLE OF TYPICAL ENGLISH BREEDS. Biochem. Jour. 30: 1728–1734, illus.

(96) Giri, K. V.
1939. INDIAN GOOSEBERRIES (PHYLLANTHUS EMBLICA LINN.) AS A SOURCE OF VITAMIN C. Indian Jour. Med. Res. 27: 429–439, illus.

(97) Gjessing, Erland C., and Trout, G. M.
1940. ASCORBIC ACID AND OXIDIZED FLAVOR IN MILK. II. THE EFFECT OF VARIOUS HEAT TREATMENTS OF MILK UPON THE STABILITY OF ASCORBIC ACID AND UPON THE DEVELOPMENT OF THE OXIDIZED FLAVOR. Jour. Dairy Sci. 23: 373–384, illus.

(98) Gorter, F. J., and Spruyt, J. P.
1939. VITAMIN A DETERMINATION BY MEANS OF RAT GROWTH TESTS. Arch. Néerland. des Sci. Exact. et Nat., Ser. III C, Arch. Néerland. de Physiol. de Homme et Anim. 24: 122–132, illus.

(99) Gould, Stella, Tressler, Donald K., and King, C. G.
1936. VITAMIN C CONTENT OF VEGETABLES. V. CABBAGE. Food Res. 1: 427–434, illus.

(100) Guerrant, N. B., Dutcher, R. A., and Dahle, C. D.
1938. THE EFFECT OF THE RIPENING PROCESS ON THE VITAMIN A CONTENT OF CHEDDAR CHEESE. Jour. Dairy Sci. 21: 69–72, illus.

(101) ——— Morck, R. A., Bechdel, S. I., and Hilston, N. W.
1938. STORAGE OF VITAMIN D IN THE TISSUES OF GROWING CALVES. Soc. Expt. Biol. and Med. Proc. 38: 827–831.

(102) ——— Rasmussen, Russel A., and Dutcher, R. Adams.
1935. THE VALUE OF THE CHEMICAL TITRATION METHOD IN DETERMINING THE VITAMIN C POTENCY OF CERTAIN FOOD SUBSTANCES. Jour. Nutr. 9: 667–675.

(103) György, Paul.
1937. CANE MOLASSES VERSUS BEET MOLASSES AS A SOURCE OF VITAMIN B_6 AND LACTOFLAVIN. Soc. Expt. Biol. and Med. Proc. 36: 167–169.

(104) Halverson, J. O., Hostetler, Earl H., Foster, J. E., and Sherwood, F. W.
1939. SOYBEAN HAY, ALFALFA HAY AND YELLOW CORN AS VITAMIN A SUPPLEMENTS IN COTTONSEED MEAL RATIONS FOR GROWING CATTLE. Jour. Nutr. 18: 285–296.

(105) ——— and Sherwood, F. W.
1940. THE VITAMIN A ACTIVITY AND THE VITAMIN B_1 CONTENT OF SOYBEANS AND COWPEAS. Jour. Agr. Res. 60: 141–144.

(106) Hand, David B., Guthrie, E. S., and Sharp, Paul F.
1938. EFFECT OF OXYGEN LIGHT AND LACTOFLAVIN ON THE OXIDATION OF VITAMIN C IN MILK. Science 87: 439–441.

(107) ——— and Sharp, Paul F.
1939. THE RIBOFLAVIN CONTENT OF COW'S MILK. Jour. Dairy Sci. 22: 779–783, illus.

(108) Hanning, Flora.
1936. COMPARISON OF THE BIOLOGICAL AND CHEMICAL METHODS FOR THE DETERMINATION OF VITAMIN C IN CANNED STRAINED VEGETABLES AND A STUDY OF ITS VARIATION FROM YEAR TO YEAR. Jour. Nutr. 12: 405–412.

(109) ———
1936. FURTHER STUDIES OF THE CONTENT OF VITAMINS A AND B IN CANNED STRAINED VEGETABLES. Amer. Dietet. Assoc. Jour. 12: 231–236.

(110) Harding, Paul L., Winston, J. R., and Fisher, D. F.
1939. SEASONAL CHANGES IN THE ASCORBIC ACID CONTENT OF JUICE OF FLORIDA ORANGES. Amer. Soc. Hort. Sci. Proc. (1938) 36: 358–370.

(111) Harris, Leslie Julius.
1937. VITAMINS IN HUMAN NUTRITION VITAMIN B_1, AND THE "BROWN VERSUS WHITE BREAD PROBLEM". I. Biochem. Jour. 31: 799–811, illus.

(112) ——— and Leong, P. C.
1937. NOTE ON THE VITAMIN-B_1 CONTENT OF VARIOUS KINDS OF BREAD AND FLOUR. Soc. Chem. Indus. Jour. Trans. and Commun. 56: 195T–196T.

(113) Harris, Philip L., and Poland, George L.
1937. VITAMIN STUDIES ON BANANAS. I. THE VITAMIN A, B_1, AND C CONTENTS OF RIPE BANANAS. Food Res. 2: 311–319, illus.

(114) ——— and Poland, George L.
1939. VARIATIONS IN ASCORBIC ACID CONTENT OF BANANAS. Food Res. 4: 317–327, illus.

(115) Harris, Robert S., and Bunker, John W. M.
1939. VITAMIN D POTENCY OF HUMAN BREAST MILK. Amer. Jour. Pub. Health 29: 744–747.

(116) Hathaway, I. L., and Davis, H. P.
1938. STUDIES ON THE VITAMIN A CONTENT OF CHEESE. Nebr. Agr. Expt. Sta. Res. Bul. 103, 10 pp.

(117) Hauck, Hazel M.
1938. VITAMIN C CONTENT OF HOME-CANNED TOMATO JUICE. Jour. Home Econ. 30: 183–188.

(118) Hawley, Estelle E.
1938. VITAMIN C CONTENT OF MILKS: RAW, PASTEURIZED, AND BABY FORMULAE. Amer. Dietet. Assoc. Jour. 14: 275–277.

(119) Hegsted, D. M., Quackenbush, F. W., Peterson, W. H., Bohstedt, G., Rupel, I. W., and King, W. A.
1939. A COMPARISON OF ALFALFA SILAGES PREPARED BY THE A. I. V. AND MOLASSES METHODS. Jour. Dairy Sci. 22: 489–500, illus.

(120) Hennessy, Douglas J., and Cerecedo, Leopold R.
1939. THE DETERMINATION OF FREE AND PHOSPHORYLATED THIAMIN BY A MODIFIED THIOCHROME ASSAY. Amer. Chem. Soc. Jour. 61: 179–183.

(121) Henry, Kathleen Mary, and Kon, Stanislaw Kazimierz.
1937. A NOTE ON THE VITAMIN D CONTENT OF COW'S COLOSTRUM. Biochem. Jour. 31: 2199–2201.

(122) ——— Houston, J., and Kon, S. K.
1940. THE ESTIMATION OF RIBOFLAVIN. PART 2. THE ESTIMATION OF RIBOFLAVIN IN MILK: COMPARISON OF FLUOROMETRIC AND BIOLOGICAL TESTS. Biochem. Jour. 34: 607–609.

(123) Hill, H. E.
1938. THE ASCORBIC ACID CONTENT OF SOME WESTERN AUSTRALIAN FRUITS (AS INDICATED BY TITRATION WITH PHENOL-INDO-2:6-DICHLOROPHENOL). Roy. Soc. West. Austral. Jour. 24: 103–106.

(124) Hodgson, R. E., Knott, J. C., Murer, H. K., and Graves, R. R.
1938. THE RELATION OF COLOR AND CAROTENE CONTENT OF ROUGHAGE IN THE DAIRY RATION TO THE COLOR, CAROTENE CONTENT, AND VITAMIN A ACTIVITY OF BUTTERFAT. Jour. Agr. Res. 57: 513–528, illus.

(125) Hodson, A. Z.
1940. THE INFLUENCE OF DIETARY RIBOFLAVIN ON THE CONTENT OF THIS VITAMIN IN CHICKEN TISSUE. Jour. Nutr. 20: 377–382.

(126) ———
1940. RIBOFLAVIN CONTENT OF SOME COMMON VEGETABLES AND FRUITS. Food Res. 5: 395–398.

(127) Hoffman, Charles, Schweitzer, T. R., and Dalby, Gaston.
1940. THE THIAMIN CONTENT OF WHOLE-WHEAT AND CLEAR FLOURS. Cereal Chem. 17: 733–736, illus.

(128) ——— Schweitzer, T. R., and Dalby, Gaston.
1940. THE LOSS OF THIAMIN IN BREAD ON BAKING AND TOASTING. Cereal Chem. 17: 737–739.

(129) Holmes, Arthur D., Tripp, Francis, and Satterfield, G. Howard.
1936. BEEF, HOG, CALF, AND LAMB LIVERS AS SOURCES OF VITAMIN A. Food Res. 1: 443–455.

(130) ——— Tripp, Francis, Woelffer, E. A., and Satterfield, G. H.
1939. A STUDY OF BREED AND SEASONAL VARIATIONS IN THE ASCORBIC ACID CONTENT OF CERTIFIED MILK FROM GUERNSEYS AND HOLSTEINS. Jour. Nutr. 17: 187–198, illus.

(131) ——— Tripp, Francis, Woelffer, Elmer A., and Satterfield, G. Howard.
1939. THE INFLUENCE OF PASTEURIZATION ON THE ASCORBIC ACID (VITAMIN C) CONTENT OF CERTIFIED MILK. Amer. Dietet. Assoc. Jour. 15: 363–368, illus.

(132) Holmes, Arthur D., Tripp, Francis, Woelffer, Elmer A., and Satterfield, G. Howard.
1940. influence of age of cow on ascorbic acid content of certified milk. Food Res. 5: 263–273.

(133) Hou, H. C.
1935. the ascorbic acid content of certain organs of chicks raised on vitamin c deficient ration. Science 82: 423.

(134) Hygaard, Arne, and Rasmussen, Harald Waage.
1939. vitamin c sources in eskimo food. Nature [London] 143: 943.

(135) Hunt, Charles, H., and Bethke, R. M.
1940. the riboflavin content of certain hays and grasses. Jour. Nutr. 20: 175–180.

(136) ——— Winter, A. R., and Bethke, R. M.
1939. further studies on the riboflavin requirements of the chicken. Poultry Sci. 18: 330–336.

(137) Ijdo, Jan Bernard Hendrik.
1936. the influence of fertilizers on the carotene and vitamin c content of plants. Biochem. Jour. 30: 2307–2312.

(138) Jacobsen, Johanne E., and Faulenborg, Gunnar.
1939. the influence of benzoic acid on the vitamin c value of preserved fruit. Ztschr. f. Vitaminforsch. 9: 48–61, illus.

(139) Jenkins, R. R., Tressler, D. K., and Fitzgerald, G. A.
1938. vitamin c content of vegetables. viii. frozen peas. Food Res. 3: 133–140, illus.

(140) Johnson, B. Connor, and Peterson, W. H.
1940. the effect of feeding pea vine silage on the carotene and vitamin a content of milk. Jour. Dairy Sci. 23: 385–389, illus.

(141) Johnson, I. J., and Miller, Elmer S.
1938. variation in carotinoid pigment concentration among inbred and crossbred strains of corn. Cereal Chem. 15: 345–350.

(142) Kelly, Eunice, Dietrich, Kathleen S., and Porter, Thelma.
1940. vitamin B_1 content of eight varieties of beans grown in two localities in michigan. Food Res. 5: 253–262, illus.

(143) Kemmerer, A. R.
1940. report on riboflavin. Assoc. Off. Agr. Chem. Jour. 23: 346–351.

(144) Kessler, Wolfgang.
1939. über den vitamin c-gehalt deutscher apfelsorten und seine abhängigkeit von herkunft, lichtgenuss, düngung, dichte des behanges und lagerung. Gartenbauwissenschaft 13: 619–638, illus.

(145) King, C. G., and Waugh, W. A.
1934. the effect of pasteurization upon the vitamin c content of milk. Jour. Dairy Sci. 17: 489–496, illus.

(146) Kirk, Mary Mann, and Tressler, Donald K.
1939. determination of ascorbic acid: electrometric titration method. Indus. and Engin. Chem., Analyt. Ed. 11: 322–323, illus.

(147) Kline, O. L., Tolle, C. D., and Nelson, E. M.
1938. vitamin B_1 assay by a rat-curative procedure. Assoc. Off. Agr. Chem. Jour. 21: 305–313, illus.

(148) Knight, Claude A., Dutcher, R. Adams, and Guerrant, N. B.
1939. the quantitative determination of vitamin c in milk. Science 89: 183–185, illus.

(149) Kon, Stanislaw Kazimierz, and Henry, Kathleen Mary.
1935. the effect of feeding cacao shell to cows on the vitamin d content of butter (milk). Biochem. Jour. 29: 2051–2056.

(150) ——— and Henry, Kathleen Mary.
1936. a comparison of the vitamin d contents of guernsey and shorthorn butter (milk). Biochem. Jour. 30: 776–779.

(151) ——— and Watson, Mearns Bruce.
1936. the effect of light on the vitamin c of milk. Biochem. Jour. 30: 2273–2290, illus.

(152) Kramer, M. M., Bair, Margaret D., Kunerth, Bernice L., and Riddell, W. H.
1938. the vitamin a value of colostrum and milk of four cows determined by the single-feeding method. Jour. Agr. Res. 56: 227–232, illus.

(153) Kramer, M. M., Dickman, R. M., Hildreth, M. D., Kunerth, B. L., and Riddell, W. H.
1939. THE RIBOFLAVIN VALUE OF MILK. Jour. Dairy Sci. 22: 753–759, illus.

(154) Krieger, C. H., and Scott, H. T.
1938. STABILITY OF VITAMIN D IN IRRADIATED EVAPORATED MILK. Food Res. 3: 283–286.

(155) Kunerth, Bernice L., Kramer, Martha M., Dickman, Regina Marie, and Whitnah, C. H.
1938. BIOLOGICAL ASSAY OF MILK WITH LACTOFLAVIN AS A STANDARD FOR VITAMIN G. Kans. Acad. Sci. Trans. 40: 297–299, illus.

(156) ——— and Riddell, W. H.
1938. SOME OBSERVATIONS ON THE VITAMIN A VALUE OF BUTTER PRODUCED UNDER DROUGHT CONDITIONS. Jour. Dairy Sci. 21: 41–44.

(157) Lanford, Caroline Sherman, Finkelstein, Beatrice, and Sherman, H. C.
1941. RIBOFLAVIN CONTENTS OF SOME TYPICAL FRUITS. Jour. Nutr. 21: 175–177.

(158) Lantz, Edith M.
1940. THE RIBOFLAVIN AND VITAMIN B_6 CONTENT OF PINTO BEANS AND THE EFFECT OF COOKING ON THESE FACTORS. Jour. Home Econ. 32: 107–112.

(159) Leong, P. C.
1939. EFFECT OF SOIL TREATMENT ON THE VITAMIN B_1 CONTENT OF WHEAT AND BARLEY. Biochem. Jour. 33: 1397–1399, illus.

(160) Leverton, Ruth M.
1937. ASCORBIC-ACID CONTENT OF BANANAS AT THREE STAGES DURING RIPENING. Food Res. 2: 59–63.

(161) Lintzel, Wolfgang, Hoffman, Gerda, and Gores, Hilde.
1938. DER VITAMIN-C-GEHALT ZUBEREITETER GEMÜSE UND GEMÜSEKONSERVEN IM WINTER. Ernährung 3: 2–9.

(162) Lunde, Gulbrand, Aschehoug, Valborg, and Kringstad, Hans.
1937. FISH AS A SOURCE OF VITAMINS A AND D. HERRING, BRISLING, AND THEIR PRODUCTS. Indus. and Engin. Chem., Indus. Ed. 29: 1171–1175.

(163) ——— Kringstad, Hans, and Olsen, Alf.
1939. ÜBER DIE BESTIMMUNG DES LACTOFLAVINS (VITAMIN B_2) IN NATURPRODUKTEN. Hoppe-Seylers Ztschr. f. Physiol. Chem. 260: 141–147.

(164) ——— Kringstad, Hans, and Olsen, Alf.
1940. VERHALTEN DES VITAMINS B_1 BEIM KOCHEN UND KONSERVIEREN VON GËMUSEN. Agnew. Chem. 53: 123–125.

(165) ——— and Lie, John.
1938. VITAMIN C IN MEERESALGEN. Hoppe-Seylers Ztschr. f. Physiol. Chem. 254: 227–240, illus.

(166) Lyons, Mary E., and Fellers, Carl R.
1939. POTATOES AS CARRIERS OF VITAMIN C. Amer. Potato Jour. 16: 169–179.

(167) McElroy, Olive E., and Munsell, Hazel E.
1938. ASCORBIC ACID CONTENT OF COMMERCIALLY CANNED TOMATOES AND TOMATO JUICE. Amer. Med. Assoc. Jour. 111: 2138–2139.

(168) ——— Munsell, Hazel E., and Stienbarger, Mabel C.
1939. ASCORBIC ACID CONTENT OF TOMATOES AS AFFECTED BY HOME CANNING AND SUBSEQUENT STORAGE, AND OF TOMATO JUICE AND FRESH ORANGE JUICE AS AFFECTED BY REFRIGERATION. Jour. Home Econ. 31: 325–330.

(169) Mack, G. L.
1936. THE STATE OF ASCORBIC ACID IN PLANT TISSUES. Nature [London] 138: 505–506.

(170) ——— Tapley, W. T., and King, C. G.
1939. VITAMIN C IN VEGETABLES. X. SNAP BEANS. Food Res. 4: 309–316.

(171) ——— Tressler, D. K., and King, C. G.
1936. VITAMIN C CONTENT OF VEGETABLES. II. PEAS. Food Res. 1: 231–235.

(172) Mack, M. J., Fellers, C. R., Maclinn, W. A., and Bean, D. A.
1936. VITAMIN C CONTENT OF DAIRY ORANGE BEVERAGES. Food Res. 1: 223–230.

(173) Maclinn, W. A., Fellers, C. R., and Buck, R. E.
1937. TOMATO VARIETY AND STRAIN DIFFERENCES IN ASCORBIC ACID (VITAMIN C) CONTENT. Amer. Soc. Hort. Sci. Proc. (1936) 34: 543–552.

(174) Marxer, A., and Muller, J. X.
1938. VARIATIONS EXPERIMENTALES DE LA TENEUR DU FOIE EN VITAMINE C. Ztschr. f. Vitaminforsch. 7: 299–301.

(175) Mayfield, Helen L., and Richardson, Jessie E.
1939. THE VITAMIN CONTENT OF GREEN STRING BEANS WHEN COOKED OR CANNED AND STORED. Mont. Agr. Expt. Sta. Bul. 373, 13 pp.

(176) ——— and Richardson, Jessie E.
1940. ASCORBIC ACID CONTENT OF PARSNIPS. Food Res. 5: 361–368.

(177) ——— and Richardson, Jessie E.
1940. THE EFFECT OF WINTER STORAGE ON THE VITAMIN CONTENT OF CABBAGE AND ONIONS. Mont. Agr. Expt. Sta. Bul. 379, 12 pp.

(178) ——— Richardson, Jessie E., Davis, Ruth J., and Andes, Erlene J.
1937. THE EFFECT OF WINTER STORAGE ON THE PALATABILITY AND VITAMIN CONTENT OF POTATOES GROWN IN MONTANA. Mont. Agr. Expt. Sta. Bul. 346, 23 pp.

(179) Melnick, Daniel, and Field, Henry, Jr.
1939. CHEMICAL DETERMINATION OF VITAMIN B_1. III. QUANTITATIVE ENZYMIC CONVERSION OF COCARBOXYLASE (THIAMINE PYROPHOSPHATE) TO THE FREE VITAMIN. Jour. Biol. Chem. 127: 531–540.

(180) Merriam, Oreana A., and Fellers, Carl R.
1936. COMPOSITION AND NUTRITIVE STUDIES ON BLUEBERRIES. Food Res. 1: 501–512.

(181) Metcalfe, Emily, Rehm, Peggy, and Winters, Jet.
1940. VARIATIONS IN ASCORBIC ACID CONTENT OF GRAPEFRUIT AND ORANGES FROM THE RIO GRANDE VALLEY OF TEXAS. Food Res. 5: 233–240.

(182) Mickelsen, Olaf, Waisman, Harry A., and Elvehjem, C. A.
1939. THE DISTRIBUTION OF VITAMIN B_1 (THIAMIN) IN MEAT AND MEAT PRODUCTS. Jour. Nutr. 17: 269–280.

(183) ——— Waisman, Harry A., and Elvehjem, C. A.
1939. THE DISTRIBUTION OF RIBOFLAVIN IN MEAT AND MEAT PRODUCTS. Jour. Nutr. 18: 517–526.

(184) Miller, Carey Dunlop, and Robbins, Ruth Coburn.
1937. THE NUTRITIVE VALUE OF PAPAYA. Biochem. Jour. 31: 1–11, illus.

(185) Mituda, Hisateru.
1938. STUDIES ON VITAMIN C. II. VARIATION OF CONTENT IN SOME FRUITS. Agr. Chem. Soc. Japan Jour. 14: 1335–1340, illus. [Abs. in Chem. Abs. 33: 7843. 1939.]

(186) Moore, L. A.
1939. VITAMIN A ACTIVITY OF MILK FAT. Mich. Agr. Expt. Sta. Quart. Bul. 21: 169–174.

(187) ———
1940. DETERMINATION OF CAROTENE IN PLANT MATERIAL. DICALCIUM PHOSPHATE AS AN ADSORBENT. Indus. and Engin. Chem., Analyt. Ed. 12: 726–729, illus.

(188) Morgan, Agnes Fay.
1933. VITAMIN TESTS ON CALIFORNIA AND ASIATIC DATES. Jour. Home Econ. 25: 603–611.

(189) ———
1935. NUTRITIVE VALUE OF DRIED FRUITS. Amer. Jour. Pub. Health 25: 328–335, illus.

(190) ——— Nobles, Helen L., Wiens, Adina, Marsh, George L., and Winkler, Albert J.
1939. THE B VITAMINS OF CALIFORNIA GRAPE JUICES AND WINES. Food Res. 4: 217–229, illus.

(191) Morgan, R. S., and Pritchard, H.
1937. THE AVERAGE VITAMIN A AND VITAMIN D POTENCY OF BUTTER. Analyst 62: 354–362, illus.

(192) Moseley, M. A. jr., and Satterfield, G. Howard.
1940. THE ASCORBIC ACID (VITAMIN C) CONTENT OF SIX VARIETIES OF CANTALOUPES. Jour. Home Econ. 32: 104–107.

(193) Mukherji, A.
1939. THE ESTIMATION OF ANEURIN BY THIOCHROME REACTION WITH PULFRICH PHOTOMETER. Indian Chem. Soc. Jour. 16: [273]–280.

(194) MURPHY, ELIZABETH.
1939. VITAMIN C AND LIGHT. Amer. Soc. Hort. Sci. Proc. (1938) 36: 498–499.

(195) MURTHY, G. NARASIMHA.
1937. A CHEMICAL METHOD FOR THE ESTIMATION OF FLAVIN IN FOODSTUFFS. Indian Jour. Med. Res. 24: 1083–1092.

(196) MUSULIN, R. R., and KING, C. G.
1936. METAPHOSPHORIC ACID IN THE EXTRACTION AND TITRATION OF VITAMIN C. Jour. Biol. Chem. 116: 409–413.

(197) MUTHANNA, M. C., and AHMAD, B.
1940. VITAMIN C CONTENT OF GERMINATED CEREALS. Current Sci. [India] 9: 320–321.

(198) NEUWEILER, W.
1935. UEBER DEN GEHALT DER FRAUENMILCH AN VITAMIN C. Ztschr. f. Vitaminforsch. 4: 39–54, illus.

(199) NEWMAN, K. R., and FELLERS, C. R.
1940. VITAMIN C IN PACKAGED FOODS PURCHASED IN RETAIL MARKETS. Amer. Dietet. Assoc. Jour. 16: 695–696.

(200) OLLIVER, MAMIE.
1936. THE ASCORBIC ACID CONTENT OF FRUITS AND VEGETABLES WITH SPECIAL REFERENCE TO THE EFFECT OF COOKING AND CANNING. Soc. Chem. Indus. Jour. Trans. and Commun. 55: 153T–163T, illus.

(201) ———
1938. THE ASCORBIC ACID CONTENT OF FRUITS AND VEGETABLES. Analyst 63: 2–17, illus.

(202) ———
1940. ANTISCORBUTIC VALUES OF FRUITS AND VEGETABLES. Lancet [London] 239: 190–192.

(203) OSTERMAN, RUBY A.
1938. THE ASCORBIC ACID CONTENT OF CELERY. Jour. Home Econ. 30: 715–716.

(204) PAMFIL, G., and MAXIM, MARIE.
1938. DER ASCORBINSÄUREGEHALT EINIGER INLÄNDISCHER NAHRUNGSMITTEL. Klin. Wchnschr. 17: 1556.

(205) PEDERSON, C. S., MACK, G. L., and ATHAWES, W. L.
1939. VITAMIN C CONTENT OF SAUERKRAUT. Food Res. 4: 31–45, illus.

(206) PULVER, R.
1940. ANALYTISCHE BESTIMMUNG DES "FREIEN FLAVINS" DURCH DIALYSE UND ULTRAFILTRATION. Ztschr. f. Vitaminforsch. 10: 88–93, illus.

(207) PYKE, MAGNUS ALFRED.
1937. THE CHEMICAL MEASUREMENT OF VITAMIN B_1 IN FOODSTUFFS AND BIOLOGICAL MATERIAL BY MEANS OF THE THIOCHROME REACTION. Biochem. Jour. 31: 1958–1963, illus.

(208) ———
1938. QUANTITATIVE MEASUREMENT OF VITAMIN B_1 BY THE THIOCHROME REACTION. Nature [London] 141: 1141.

(209) ———
1939. THE DISTRIBUTION ON VITAMIN-B_1 IN FOODS AS DETERMINED BY CHEMICAL ANALYSIS. Soc. Chem. Indus. Jour. Trans. and Commun. 58: 338–340.

(210) ———
1940. OBSERVATIONS ON THE DISTRIBUTION OF VITAMIN B_1 IN SOME PLANT FAMILIES. Biochem. Jour. 34: 330–334.

(211) RANGANATHAN, S.
1935. THE VITAMIN C CONTENT OF SOME INDIAN FOOD-STUFFS. Indian Jour. Med. Res. 23: 239–252.

(212) ———
1936. FURTHER STUDIES ON THE EFFECT OF STORAGE ON THE VITAMIN C POTENCY OF FOOD-STUFFS. Indian Jour. Med. Res. 23: 755–762.

(213) RASMUSSEN, RUSSEL, BOGART, RALPH, and MAYNARD, L. A.
1938. ASCORBIC ACID CONTENT OF MILK OF VARIOUS SPECIES AS INFLUENCED BY ASCORBIC ACID INJECTION AND DIET. Soc. Expt. Biol. and Med. Proc. 39: 502–505, illus.

(214) Rasmussen, Russel, Bogart, Ralph, and Maynard, L. A., Guerrant, N. B., Shaw, A. O., Welch, R. C., and Bechdel, S. I.
1936. THE EFFECTS OF BREED CHARACTERISTICS AND STAGES OF LACTATION ON THE VITAMIN C (ASCORBIC ACID) CONTENT OF COW'S MILK. Jour. Nutr. 11: 425–432, illus.

(215) Reder, Ruth.
1938. THE VITAMIN D CONTENT OF CERTAIN EGG AND EGG OIL PRODUCTS. Poultry Sci. 17: 521–522.

(216) Repetto, Osvaldo M.
1939. CONTENIDO EN VITAMINA C DE VEGETALES ARGENTINOS COMESTIBLES. Asoc. Quím. Argentina An. 27: 140–144.

(217) Richardson, Jessie E., Davis, Ruth, and Sullivan, Phyllis.
1937. SOME OBSERVATIONS ON VITAMIN-C CONTENT OF ORANGES AND LEMONS. Food Res. 2: 81–83.

(218) ——— and Mayfield, Helen L.
1940. THE QUALITY AND VITAMIN CONTENT OF GREEN PEAS WHEN COOKED OR HOME CANNED. Mont. Agr. Expt. Sta. Bul. 381, 19 pp., illus.

(219) ——— Mayfield, Helen L., and Davis, Ruth J.
1937. THE EFFECT OF HOME PRESERVATION ON THE QUALITY AND VITAMIN CONTENT OF GOLDEN BANTAM SWEET CORN. Mont. Agr. Expt. Sta. Bul. 347, 22 pp., illus.

(220) Richmond, Martha S., Satterfield, G. H., Grinnells, C. D., and Dann, W. J.
1940. ASCORBIC ACID CONTENT OF GOAT'S MILK AND BLOOD: INFLUENCE OF ASCORBIC ACID INJECTION AND DIET. Jour. Nutr. 20: 99–108, illus.

(221) Riddell, W. H., Whitnah, C. H., Hughes, J. S., and Lienhardt, H. F.
1936. INFLUENCE OF THE RATION OF THE VITAMIN C CONTENT OF MILK. Jour. Nutr. 11: 47–54.

(222) Roberts, John A.
1937. VITAMIN C IN CITRUS-JUICE BEVERAGES AND CANNED GRAPEFRUIT JUICE. Food Res. 2: 331–337, illus.

(223) Rogers, E. Charlotte, and Mathews, Doris B.
1938. THE VITAMIN C CONTENT OF CONNECTICUT HOME CANNED TOMATOES. Jour. Home Econ. 30: 114–116.

(224) Rolf, Lydia A.
1940. THE EFFECT OF COOKING AND STORAGE ON THE ASCORBIC ACID CONTENT OF POTATOES. Jour. Agr. Res. 61: 381–395, illus.

(225) Rudra, Mahendra Nath.
1936. DISTRIBUTION OF VITAMIN C IN DIFFERENT PARTS OF COMMON INDIAN FOODSTUFFS. Biochem. Jour. 30: 701–703.

(226) ———
1937. STUDIES IN VITAMIN C. THE EFFECT OF COOKING AND STORAGE ON THE VITAMIN C CONTENTS OF FOODSTUFFS. Indian Jour. Med. Res. 25: 89–93.

(227) Saffry, Olga B., Cox, Hazel S., Kunerth, Bernice L., and Kramer, Martha M.
1940. A BIOLOGICAL ASSAY OF RIBOFLAVIN IN THE LIVER OF THE COW, CALF, SHEEP, LAMB, AND HOG. Jour. Nutr. 20: 169–174, illus.

(228) Satterfield, G. Howard, and Yarbrough, Mary.
1940. VARIETAL DIFFERENCES IN ASCORBIC ACID (VITAMIN C) CONTENT OF STRAWBERRIES Food Res. 5: 241–245.

(229) Schätzlein, Ch., and Fox-Timmling, E.
1940. UNTERSUCHUNGEN ÜBER DEN VITAMIN C-GEHALT VON GEMÜSE UND OBST. Ztschr. f. Untersuch. der Lebensmtl. 79: 157–164.

(230) Scheunert, A., Reschke, Johs., and Kohlemann, Eva.
1936. ÜBER DEN VITAMIN-C-GEHALT DER KARTOFFELN. I. MITTEILUNG: ALTE GELAGERTE KARTOFFELN DER ERNTE 1935. Biochem. Ztschr. 288: [261]–270.

(231) ——— and Schieblich, M.
1935 UEBER DEN VITAMINGEHALT DES BIERES. Ztschr. f. Vitaminforsch. 4: 294–299.

(232) Schlutz, F. W., and Knott, Elizabeth M.
1939. FACTORS AFFECTING THE VITAMIN B_1 CONTENT OF EVAPORATED MILK. Soc. Expt. Biol. and Med. Proc. 40: 532–535.

(233) Schormüller, Josef.
1939. ÜBER DAS VORKOMMEN VON VITAMIN B_2 (LACTOFLAVIN). 1. MITTEILUNG. VITAMIN B_2 IM MUSKEL. Ztschr. f. Untersuch. der Lebensmtl. 77: 1–18, illus.

(234) Schultz, A. S., Atkin, L., and Frey, C. N.
1939. THE VITAMIN B_1 CONTENT OF WHEAT, FLOUR AND BREAD. Cereal Chem. 16: 643–648, illus.

(235) ——— Atkin, Lawrence, and Frey, Charles N.
1941. A PRELIMINARY SURVEY OF THE VITAMIN B_1 CONTENT OF AMERICAN CEREALS. Cereal Chem. 18: 106–113.

(236) Schumacher, A. E., and Heuser, G. F.
1940. RIBOFLAVIN CONTENT OF YEASTS. Indus. and Engin. Chem., Analyt. Ed. 12: 203–204.

(237) Selleg, Iva, and King, C. G.
1936. THE VITAMIN C CONTENT OF HUMAN MILK AND ITS VARIATION WITH DIET. Jour. Nutr. 11: 599–606.

(238) Semb, J., Baumann, C. A., and Steenbock, H.
1934. FAT-SOLUBLE VITAMINS. XLI. THE CAROTENE AND VITAMIN A CONTENT OF COLOSTRUM. Jour. Biol. Chem. 107: 697–703.

(239) Sherman, William C.
1940. CHROMATOGRAPHIC IDENTIFICATION AND BIOLOGICAL EVALUATION OF CAROTENE FROM MATURE SOYBEANS. Food Res. 5: 13–22.

(240) ——— and Salmon, William D.
1939. CAROTENE CONTENT OF DIFFERENT VARIETIES OF GREEN AND MATURE SOYBEANS AND COWPEAS. Food Res. 4: 371–380.

(241) Smith, Alexander Martin, and Gillies, John.
1940. THE DISTRIBUTION AND CONCENTRATION OF ASCORBIC ACID IN THE POTATO (SOLANUM TUBEROSUM). Biochem Jour. 34: 1312–1320, illus.

(242) Snell, E. E., and Strong, F. M.
1939. A MICROBIOLOGICAL ASSAY FOR RIBOFLAVIN. Indus. and Engin. Chem., Analyt. Ed. 11: 346–350, illus.

(243) Snyder, W. W., and Moore, L. A.
1940. THE CAROTENE CONTENT OF SEVERAL HERBAGES DURING THE GROWING SEASON. Jour. Dairy Sci. 23: 363–371.

(244) Spruyt, J. P.
1938. THE VITAMIN C CONTENT OF INDIAN FRUITS. (III). (DETERMINED ALSO BY MEANS OF THE FERMENT METHOD) Arch. Néerland. des Sci. Exact. et Nat., Ser. III C, Arch. Néerland. de Physiol. de Homme et Anim. 23: 433–439.

(245) Srinivasan, Mudambi.
1937. THE ENZYMIC DETERMINATION OF ASCORBIC ACID. Biochem. Jour. 31: 1524–1529.

(246) Stimson, C. R.; Tressler, D. K.; and Maynard, L. A.
1939. CAROTENE (VITAMIN A) CONTENT OF FRESH AND FROSTED PEAS. Food Res. 4: 475–483.

(247) Sullivan, Royal A., and Norris, L. C.
1939. DETERMINING RIBOFLAVIN IN DRIED MILK PRODUCTS. Indus. and Engin. Chem., Analyt. Ed. 11: 535–540, illus.

(248) Sumi, M., and Ako, T.
1940. VITAMIN B_2 (FLAVIN) CONTENTS IN FOODS. PART II—STUDIES ON CERTAIN AQUATIC PRODUCTS. Inst. Phys. and Chem. Res., Japan, Bul. 19: 240–242. [In Japanese. Abs. in Chem. Abs. 34: 5187. 1940.]

(249) ——— and Tsuzuki, Ziro.
1938. THE FLAVIN (VITAMIN B_2) CONTENT OF SOME FOODSTUFFS. Inst. Phys. and Chem. Res., Japan, Bul. 17: 1296–1299. [In Japanese. Abs. in Chem. Abs. 34: 2939. 1940.]

(250) Supplee, G. C., Bender, R. C., and Jensen, O. G.
1939. DETERMINING RIBOFLAVIN. A FLUOROMETRIC AND BIOLOGICAL METHOD. Indus. and Engin. Chem., Analyt. Ed. 11: 495–498, illus.

(251) Svirbely, Joseph Louis.
1933. THE ASCORBIC ACID CONTENT OF THE ADRENALS AND LIVERS OF DIFFERENT ANIMALS. Biochem. Jour. 27: [960]–963.

(252) Swanson, Pearl, Stevenson, Gladys, Haber, E. S., and Nelson, P. Mabel.
1940. EFFECT OF FERTILIZING TREATMENT ON VITAMIN A CONTENT OF SWEET POTATOES. Food Res. 5: 431–438.

(253) ——— Stevenson, Gladys, and Nelson, P. Mabel.
1940. EFFECT OF STORAGE ON VITAMIN A CONTENT OF CANNED TOMATOES. Jour. Home Econ. 32: 246–251.

(254) Tauber, Henry.
1936. STABILITY OF VITAMIN C, AND ABSENCE OF ASCORBIC ACID OXIDASE IN CITROUS FRUITS AND MILK. Soc. Expt. Biol. and Med. Proc. 35: 422–423.

(255) ——— and Kleiner, Israel S.
1935. AN ENZYMIC METHOD FOR THE ESTIMATION OF TRUE VITAMIN C. Jour. Biol. Chem. 110: 559–563.

(256) Thornton, Norwood C.
1938. CARBON DIOXIDE STORAGE. XI. THE EFFECT OF CARBON DIOXIDE ON THE ASCORBIC ACID (VITAMIN C) CONTENT OF SOME FRUITS AND VEGETABLES. Amer. Soc. Hort. Sci. Proc. (1937) 35: 200–201.

(257) Todhunter, E. Neige.
1936. SOME FACTORS INFLUENCING ASCORBIC-ACID (VITAMIN-C) CONTENT OF APPLES. Food Res. 1: 435–442.

(258) ———
1939. FURTHER STUDIES ON THE VITAMIN A AND C CONTENT OF WASHINGTON GROWN APPLES. Wash. Agr. Expt. Sta. Bul. 375, 24 pp.

(259) ———
1939. VITAMIN VALUES OF GARDEN-TYPE PEAS PRESERVED BY FROZEN-PACK METHOD. II. VITAMIN A. Food Res. 4: 587–592.

(260) ——— and Sparling, B. L.
1938. VITAMIN VALUES OF GARDEN-TYPE PEAS PRESERVED BY FROZEN-PACK METHOD. I. ASCORBIC ACID (VITAMIN C). Food Res. 3: 489–498.

(261) Tomaszewski, W., and Engel, Chr.
1939. VITAMIN A UND C BEI KÜCKEN WÄHREND DER VITAMIN K-AVITAMINOSE. Ztschr. f. Vitaminforsch. 9: 238–242.

(262) Tressler, Donald K., and Curran, Katherine M.
1938. THE CAUSE OF LOSS OF VITAMIN C FROM BOTTLED TOMATO JUICE. Jour. Home Econ. 30: 487–488.

(263) ——— Mack, G. L., Jenkins, R. R., and King, C. G.
1937. VITAMIN C IN VEGETABLES. VII. LIMA BEANS. Food Res. 2: 175–181.

(264) ——— Mack, Guilford L., and King, C. G.
1936. FACTORS INFLUENCING THE VITAMIN C CONTENT OF VEGETABLES. Amer. Jour. Pub. Health 26: 905–909, illus.

(265) ——— Mack, G. L., and King, C. G.
1936. VITAMIN C CONTENT OF VEGETABLES. I. SPINACH. Food Res. 1: 3–7.

(266) Tripp, Francis, Satterfield, G. Howard, and Holmes, Arthur D.
1937. VARIETAL DIFFERENCES IN THE VITAMIN C (ASCORBIC ACID) CONTENT OF TOMATOES. Jour. Home Econ. 29: 258–262.

(267) Trout, G. M., and Gjessing, Erland C.
1939. ASCORBIC ACID AND OXIDIZED FLAVOR IN MILK. I. DISTRIBUTION OF ASCORBIC ACID AND OCCURRENCE OF OXIDIZED FLAVOR IN COMMERCIAL GRADE A RAW, IN PASTEURIZED IRRADIATED, AND IN PASTEURIZED MILK THROUGHOUT THE YEAR. Jour. Dairy Sci. 22: 271–281, illus.

(268) Vahlteich, H. W.
1938. WATER-SOLUBLE VITAMINS (B_1 AND G) OF BUTTER AND MARGARIN. Amer. Dietet. Assoc. Jour. 14: 277–278.

(269) Van Eekelen, M.
1935. ESTIMATION OF ASCORBIC ACID BY TITRATION. Nature [London] 136: 144–145.

(270) Vladesco, R., and Prahoveanu, H.
1939. LE LAIT ET LA VITAMINE C, EN ROUMANIE. Lait 19: 798–805.

(271) Wachholder, Kurt, Heidinger, Elfriede, Grieben, Irene, and Köhler, Hans.
1938. ÜBER DEN VITAMIN C-GEHALT ROHER UND VERSCHIEDEM ZUBEREITERETER KARTOFFELN UND ÜBER DESSEN ERNÄHRUNGSPHYSIOLOGISCHE BEDEUTUNG. Biochem. Ztschr. 295: [237]–245.

(272) Wagner, J. R., Axelrod, A. E., Lipton, M. A., and Elvehjem, C. A.
1940. A RAT ASSAY METHOD FOR THE DETERMINATION OF RIBOFLAVIN. Jour. Biol. Chem. 136: 357–364, illus.

(273) Wagner, Karl-Heinz, and Vermeulen, Marc.
1939. DER WAL ALS VITAMIN-A-QUELLE. Die Ernährung 4: 193–199.

(274) Wagner, Lucille E., Hoffman, J. C., and Brown, H. D.
1940. CORRELATION BETWEEN THE VITAMIN C CONTENT AND REFRACTIVE INDICES OF MUSKMELONS. Amer. Soc. Hort. Sci. Proc. (1939) 37: 839–840.

(275) Wallis, G. C.
1939. THE CONCENTRATION OF VITAMIN D IN THE BLOOD OF DAIRY CATTLE AS COMPARED WITH THE POTENCY OF THE MILK PRODUCED. S. Dak. Acad. Sci. Proc. 19: 55–60.

(276) ———
1939. THE VITAMIN D OF ALFALFA AND PRAIRIE HAY AND ITS UTILIZATION BY DIARY COWS. Jour. Dairy Sci. 22: 599–606.

(277) ——— and Olson, T. M.
1938. THE EFFECT OF SEASON AND FEEDS ON THE VITAMIN D CONTENT OF MILK UNDER SOUTH DAKOTA CONDITIONS. S. Dak. Agr. Expt. Sta. Bul. 321, 11 pp., illus.

(278) Wellington, Marylizabeth, and Tressler, Donald K.
1938. VITAMIN C CONTENT OF VEGETABLES. IX. INFLUENCE OF METHOD OF COOKING ON VITAMIN C CONTENT OF CABBAGE. Food Res. 3: 311–316.

(279) Werder, J., and Antener, J.
1938. ZUR VITAMIN-C-BESTIMMUNG IN NAHRUNGSMITTELN. Mitt. aus dem Geb. der Lebensmtl. Untersuch. u. Hyg. 29: 339–349.

(280) Wheeler, Katherine, Tressler, D. K., and King C. G.
1939. VITAMIN C CONTENT OF VEGETABLES. XII. BROCCOLI, CAULIFLOWER, ENDIVE, CANTALOUP, PARSNIPS, NEW ZEALAND SPINACH, KOHLRABI, LETTUCE, AND KALE. Food Res. 4: 593–604.

(281) Whipple, Dorothy V.
1935. VITAMINS A, D AND B IN OYSTERS—EFFECT OF COOKING UPON VITAMINS A AND B. Jour. Nutr. 9: 163–173, illus.

(282) Whitnah, C. H., Kunerth, Bernice L., and Kramer, M. M.
1937. A RAPID METHOD FOR THE DETERMINATION OF LACTOFLAVIN IN MILK. Amer. Chem. Soc. Jour. 59: 1153–1154.

(283) ——— Kunerth, B. L., and Kramer, M. M.
1938 RIBOFLAVIN CONTENT OF MILK COLLECTED IN DIFFERENT MONTHS AND CORRELATED WITH OTHER CONSTITUENTS OF THE MILK. Jour. Dairy Sci. 21: 593–600, illus.

(284) ——— and Riddell, W. H.
1936. MILK AS A SOURCE OF VITAMIN C. Science 83: 162.

(285) ——— and Riddell, W. H.
1937. VARIATIONS IN THE VITAMIN C CONTENT OF MILK. Jour. Dairy Sci. 20: 9–14.

(286) ——— Riddell, W. H., and Caulfield, W. J.
1936. THE INFLUENCE OF STORAGE, PASTEURIZATION, AND CONTAMINATION WITH METALS ON THE STABILITY OF VITAMIN C IN MILK. Jour. Dairy Sci. 19: 373–383.

(287) Wiegand, J. A.
1938. ANEURINBESTIMMUNGEN IN MILCH UND MILCHPULVER. Arch. Néerland. des. Sci. Exact. et Nat., Ser. III C, Arch. Néerland. de Physiol. de Homme et Anim. 23: 312–330, illus.

(288) ———
1938. ANEURINBESTIMMUNG IN GETREIDEARTEN UND KARTOFFELN. Arch. Néerland. des Sci. Exact. et Nat., Ser. III C, Arch. Néerland. de Physiol. de Homme et Anim. 23: 331–358.

(289) Wilkinson, H.
1939. THE VITAMIN A AND VITAMIN D CONTENTS OF BUTTER. II. SEASONAL VARIATION. Analyst 64: 17–23, illus.

(290) WILLSTAEDT, H., and JENSEN, H. BEHRNTS.
1939. UNTERSUCHUNGEN ÜBER DEN GEHALT AN VITAMIN A-WIRKSAMEN VERBINDUNGEN IN DÄNISCHEN NAHRUNGSMITTELN. III. MITTEILUNG. UEBER DEN GEHALT AN CAROTINOIDEN, HAUPTSÄCHLICH B-CAROTIN, IN EINIGEN ROHEN UND KÜCHENMÄSSIG BEHANDELTEN GEMÜSEN. Ztschr. f. Vitaminforsch. 9: 8–13, illus.

(291) WILSON, H. ELLIS C., and ROY, G. K.
1938. THE FLAVINE AND VITAMIN-B_6 (ANTI-DERMATITIS) CONTENT OF INDIAN FOODSTUFFS. Indian Jour. Med. Res. 25: 879–892.

(292) WOESSNER, WARREN W., ELVEHJEM, C. A., and SCHUETTE, HENRY A.
1939. THE DETERMINATION OF ASCORBIC ACID IN COMMERCIAL MILKS. Jour. Nutr. 18: 619–626.

(293) ——— ELVEHJEM, C. A., and SCHUETTE, HENRY.
1940. THE DETERMINATION OF ASCORBIC ACID IN EVAPORATED MILK, POWDERED MILK AND POWDERED MILK PRODUCTS. Jour. Nutr. 20: 327–338.

(294) ——— WECKEL, K. G., and SCHUETTE, HENRY A.
1940. THE EFFECT OF COMMERCIAL PRACTICES ON ASCORBIC ACID AND DEHYDROASCORBIC ACID (VITAMIN C) IN MILK. Jour. Dairy Sci. 23: 1131–1141.

(295) YARBROUGH, MARY, and SATTERFIELD, G. HOWARD.
1939. THE RELATIONSHIP OF ACIDITY TO THE VITAMIN C CONTENT OF TOMATOES. Ztschr. f. Vitaminforsch. 9: 209–212.

(296) ZECHMEISTER, L., and CHOLNOKY, L.
1940. CAROTENOIDS OF HUNGARIAN WHEAT FLOUR. Jour. Biol. Chem. 135: 31–36.

(297) ZIMMERMAN, WILLIAM I., TRESSLER, DONALD K., and MAYNARD, LEONARD A.
1940. DETERMINATION OF CAROTENE IN FRESH AND FROZEN VEGETABLES. I. CAROTENE CONTENT OF GREEN SNAP BEANS AND SWEET CORN. Food Res. 5: 93–101.

(298) ZORN, WILHELM, RICHTER, FRIDOLIN, and WIENER, CARL.
1938. DIE BEDEUTUNG DER SCHAMILCH FÜR DIE VOLKSERNÄHRUNG. Ernährung 3: 85–98, illus.

○